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THESIS

COST BENEFIT ANALYSIS OF ESTABLISHING A NETWORK-BASED TRAINING SYSTEM IN THE TURKISH COAST GUARD

by

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December 2009

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13. ABSTRACT (maximum 200 words)

Both education and training are undeniably necessary for organizations to develop their workforces and to achieve success in the fast-changing world. The results of this research showed that the implementation of a supplemental network-based training system in the Turkish Coast Guard is technically and economically feasible. The research presented a cost-benefit analysis evaluating the value of the proposed system. The analysis provides a methodology to estimate the costs, benefits and costs savings if the organization takes advantage of online training technologies. Potential cost savings, improved operational readiness, reduced training time, increased flexibility, and eliminated time and place dependency are some of the major benefits for the military organizations. The importance of lifelong learning is also increasing. Emerging technologies present new ways of incorporating e-learning into worksites. This research report examines the feasibility and value of developing and implementing network-based training technologies in addition to the traditional face-to-face training system in the Turkish Coast Guard. The application of a proposed system may not entail significant amounts of capital investment, since the organization already has the infrastructure needed, but it is obvious that using both systems together will give the organization the advantage of flexibility. There is a significant amount of literature about the effectiveness, efficiency, speed, and economics of network-based training. However, each organization is different and has its own attributes and abilities. As a consequence, these issues should be examined within each organization's own dynamics.

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Feeling gratitude and not expressing it is like wrapping a present
and not giving it.

–William Arthur Ward

First and foremost, no words are enough to describe Turkish people's thankfulness to Mustafa Kemal Ataturk. Your legacy and ideologies will continue to be our inspiration and the compass that shows the right way.

I would like to extend special thanks to my advisors: Douglas E. Brinkley, Kenneth H. Doerr, and William D. Hatch. I greatly appreciate their valuable suggestions and contributions that help finishing of this thesis.

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I. INTRODUCTION

A. PREFACE

A considerable amount of literature has been written focused on the premise of how technology has changed peoples' lives. To sum up the idea concisely, the end of the twentieth and the beginning of the twenty-first century have introduced mankind to a new era called the “Information Age.” In other words, it is the “Knowledge Age” or “Age of Learning” (Rowley, Lujan, & Dolence, 1998). According to Solove (2004), people are in the middle of an information evolution and witnessing a dramatic transformation in the era of information. While change is not something new and has always existed throughout history, Inglis, Ling, and Joosten (1999) state that the change people are going through is fundamentally different, the nature of change is more radical, and the pace of change continues to increase. People are experiencing more radical changes at a pace difficult to maintain. The main factor of the change that characterizes the period is technology (Inglis et al., 1999). According to Pasternack and Viscio (1998), “Technological change has delivered the Information Age and converted it to the Knowledge Age” (p. 29). In this new era, thanks to technology, people are now able to access knowledge easily, use it without difficulty, and transfer it instantly in countless ways. The introduction of new technologies has changed the way things are done. The biggest changes have been facilitated by the advances in communication and information technology. The advent of technology, especially the Internet and Intranet, has substantially elevated the importance of knowledge and organizations are becoming more reliant on knowledge (Pasternack & Viscio, 1998).

As Nissen (2006) states, “knowledge is the power” (p. IX). Obviously, people who have information have the power. Today’s illiterates are not people who are unable to read and write, but those who cannot access knowledge or use it and transfer it effectively. Since the ever-changing nature of the new world

has been changing the rules of the game continuously, the way of possessing this power has been changed. The Internet has a crucial influence and effect on people and organizations. “Information is available at any time from any place to any Internet user” (Aggarwal & Bento, 2002, p. 59). According to Pasternack and Viscio (1998), “the advent of technology, particularly the Internet and Intranet, has tremendously elevated the significance of knowledge, allowing it to be used in more creative ways” (p. 96). And Brooks, Nolan and Gallagher (2001) are certainly correct in saying that the technology has changed what we learn and how we learn it.

There is no doubt that demand for knowledge in the information era is increasing exponentially. According to the supply and demand theory, to satisfy the demand for knowledge means an increase in the supplying of knowledge. According to Rowley, et al. (1998), not only the number of schools but also the schools' structure and options for learning have been changing and increasing. Up until the information age, mankind relied on traditional sources such as schools, colleges, universities, and other institutions to possess and disseminate knowledge. During the information era and in addition to traditional sources, computers, software, databases, networks, computer-based systems, and in short, all kinds of information technologies (IT) have been meaningful providers and disseminators of knowledge. With the information age, these untraditional sources of learning have changed peoples' way of learning (Rowley et al., 1998). According to Aggarwal and Bento (2002), “Learning can take place in a variety of environments beyond traditional classroom, and the Web may be used to replicate and expand the possibilities of each of those environments” (p. 62).

They also maintain that advances in information technology offer a time- and space-independent, learning-centered, goal-oriented instructional environment. Inglis et al. (1999) point out that a shift to the Web and multimedia offer the possibility of a cheaper, faster, and better learning environment.

One question that comes to mind is, what is the impact of the information age on organizations? According to Pasternack and Viscio (1998), the

information age has been both offering opportunities and creating challenges for organizations. Organizations using information technologies are thriving today. On the other hand, organizations that cannot keep up with technological changes are unable to survive. Another thing Rousseaue (1997) states is that organizations will increasingly need to learn in this era.

To meet the challenges created by the information age, organizations are looking at ways to turn these challenges into a comparative advantage. Since people are the most valuable resources in any organization in achieving its goals, organizations have invested a significant amount of time, energy, and resources to increase the quality of their human capital. While keeping in mind that people are the most important asset in organizations, how do organizations increase the competencies of their personnel?

There are three popular ways:

- Recruitment process
- Education
- Training

Selecting qualified and educated people is not sufficient in today's ever-changing and challenging world, and not only new employees but also existing employees need training to keep up. According to Funk and McBride (2000), the digital age has changed the nature of work, what must be learned, the process of learning, and the methods for training. According to Kaplan (as cited in Funk & McBride, 2000, p. 550) an electrical engineer's education is easily outdated in the space of eight years after graduation from college, while a medical doctor's education is dated within five years. The process and methods of learning in training and education will change and begin to merge in the early twenty-first century. This shows that personnel training in organizations will play a more crucial role in the following years and decades. Organizations will continue to invest significant amounts of time, energy, and resources to increase the quality of their human capital. According to Pasternack and Viscio (1998), well-trained people are essential to organizations. According to Savage (1996), what

organizations should do is create working conditions under which learning, insights, vision, capabilities, and aspirations can be more effectively utilized. Savage (1996) also points out that networking such as a corporate-wide Intranet and access to the World Wide Web is a precondition for organizational success.

In order to meet the challenges of the twenty-first century, like other sectors, military organizations need to be open to changes. Moreover, better management of organizational changes will improve the mission effectiveness of units. For achieving far-reaching and profound changes, implementation of information technologies (IT), information management (IM), and knowledge management (KM) are essential in the information age (Porter, Bennet, Turner, & Wennergren, n.d.).

A network can be used either in place of traditional methods or as a supplemental method in organizational training. This research report looks at the usage of network-based learning/training technologies in addition to the traditional face-to-face training systems. The application of a proposed system will not entail significant amounts of capital investment if the organization already has the infrastructure needed, and it is obvious that using both systems together will give an organization the advantage of flexibility. There is a significant amount of literature about the effectiveness, efficiency, speed, and economics of network-based training. However, each organization is different and has its own attributes and abilities. As a consequence, these issues should be examined in each organization's dynamics. In this research, the author examines the question of whether the Turkish Coast Guard can implement a network-based training system. In addition to analyzing the benefits and limitations, investigating the effectiveness, and examining the potential impact of establishing a network-based learning/training system, the author will conduct a cost-benefit analysis to find out whether a proposed system can reduce training-related costs "so that the Turkish Coast Guard Command can move forward into the future with confidence in the pursuit of achieving its goals" (http://www.sgk.tsk.tr/). However, careful strategic planning of a proposed system is crucial to its success.

B. BACKGROUND

In order to

- protect the interests of Turkey in its maritime regions,
- enforce national and international laws, and
- ensure the safety of life and property of public,

the Turkish Coast Guard Command was founded on September 1, 1982, as part of the General Command of Gendarmerie. Currently, it is one of five armed services of the Turkish Republic. It is the smallest force compared to Land Forces, Naval Forces, Air Forces, and the General Command of Gendarmerie (http://www.sgk.tsk.tr/). An important characteristic of the Coast Guard is its geographically dispersed organization and deployment of its units.

To accomplish its missions and sustain its development into the twenty-first century, the Coast Guard is aware of the importance of a competent work force. The Coast Guard Training and Education Center started to operate in 1989. Since then, to improve the performance of Coast Guard personnel consisting of officers, petty officers, contracted enlisted and civilian people, the Training and Education Center has offered many different training programs. In addition, the Coast Guard Command has taken additional steps in order to support its training policy such as giving training in units. Moreover, lectures, conferences, and seminars are arranged on a monthly and yearly basis. For all of the training methods, the Coast Guard Command uses only traditional face-to-face instruction with the exception of some simulation programs. As described earlier, innovations in IT offer different kinds of training possibilities such as computer-based and network-based training systems. Unfortunately, the Coast Guard Command is currently not taking advantage of these alternative approaches to training and education.

C. OBJECTIVES

The following are the objectives of this research paper:

- Analyze the benefits and limitations of establishing and using a network-based training system in the Turkish Coast Guard Command,

- Investigate what impact a proposed system would have on the effectiveness and efficiency of trainings in the Turkish Coast Guard Command,

- Conduct a cost analysis , including the transportation costs, of establishing and using network-based training in the Turkish Coast Guard Command,

- Examine the potential impact of the proposed system on productivity in the Turkish Coast Guard Command.

D. ORGANIZATION OF THESIS

The paper is organized and divided into the following parts/topics.

1. Literature review
    a. Training and organizational approach
    b. Instructional approach to training
    c. Media selection, and network-based training
    d. Needs assessment
    e. Critical success factors and requirements
    f. Network-based training design
    g. Summary
2. Organizational analysis
    a. Establishing the proposed system
        1) Purpose

2) Background
3) Training delivery alternatives
4) The structure of the proposed system
5) The components of the proposed system
6) General description of the project
7) Feasibility study
8) Benefits and limitations

b. Cost benefit analysis
1) Estimated costs
2) Estimated revenues
3) Costs savings analysis
4) Sensitivity analysis
5) Risk analysis

3. Summary, conclusions and recommendations
a. Summary
b. Conclusions
c. Recommendations

The first chapter describes key concepts, models, and theories in order to conduct an extensive literature review that will lay the groundwork for the appropriate research analysis. The second chapter focuses on conducting an organizational analysis in its own dynamics by means of exploiting the findings of the literature review constructed in the first chapter, interpreting research data, establishing a cost-benefit analysis, and building a conceptual network-based training system. The evaluated results of the analysis provide detailed potential outcomes, as well as costs and benefits of the proposed system. Finally, in the third chapter, conclusions and recommendations are given. Together, these chapters, hopefully, provide the answers to the research questions and help achieve research objectives.

E. METHODOLOGY

The methodology of this research includes two parts.

- Composing a literature review regarding training, training delivery, and network-based training to define key concepts, models, and theories on the topic
- Collecting data and conducting an organizational analysis in its own dynamics by means of exploiting the findings of the literature and interpreting research data and then building a conceptual network-based training system.

The findings of each part of the research will yield results that will help achieve the research objectives.

II. LITERATURE REVIEW

A. TRAINING AND ORGANIZATIONAL APPROACH

People are the most valuable assets in any organization, and a competent workforce is a critical element to organization's success (Mayo, 2001). As Maurer (1999) states, the key assets of any kind of high-performance organization such as a company, governmental agency or academic institution, are not property, buildings, machinery, or inventory, but the knowledge possessed by its employees. The more organizations increase the quality and utilization of their most valuable assets, people, the more they are able to achieve their goals. According to McShane & Von Glinow (2009), the challenge is that each job requires different types of skills, knowledge, aptitudes, and other personal characteristics that lead to an increase in the quality and competencies of an organization's workforce. One of the strategies is to select applicants whose existing competencies best fit the required skills and tasks. This includes comparing each applicant's competencies with the requirements of the job or work unit. Education raises the quality and competencies of organizational workforce by promoting personal growth. A third approach is to provide training so employees develop required skills and knowledge to improve their performance on the job (Berge, 2001). Recent evidence suggests that training has a strong influence on organizational performance (McShane & Von Glinow, 2009). Furthermore, technological advances have elevated not only the importance of a better training and education but also the need for lifelong learning.

Miller (1996) states that inventing tools, weapons, clothing, shelter, and language resulted in a substantial amount of knowledge in the Stone Age and the need for training emerged and became indispensable for civilization. Zwane (1995) maintains that since then, the words training, education and development have been used interchangeably (as cited in Jerling, 1996). Today, many

organizations are using training as a strategic tool to prepare employees for new responsibilities, to help their organizations' success, and to improve organizational development. Armstrong (1997) provides one of the recognized definitions of training: "systematic development of the knowledge, skills and attitudes required by an individual to perform adequately a given task or job" (as cited in Currie, 1997, p. 168).

According to Tobias and Frase (2000), the size of the training budget is the evidence of the importance an organization places on training. The U.S. Department of Defense's budget for training is approximately $14–15 billion annually, and that figure does not include all field and fleet exercises, factory training, and air combat training. It is also estimated that business and industry spend $210 billion for formal and informal training annually (Tobias & Frase, 2000). Goldstein and Ford (2002) also point out the money and effort spent on training and they give the following example. In a survey, known as the Human Performance Practices Survey (HPPS), the American Society for Training and Development estimated that $55 billion was spent by employers on formal training in 1998 (Goldstein & Ford, 2002).

As Berge (2001) stated, training should not be perceived as a cost center but an investment. Despite the fact that training is a costly investment, it ensures the investor with a high return. One study found that a 10% increase in the educational attainment of an organization's workforce resulted in an 8.6% increase in productivity; however, a 10% increase in value of capital stock only produces a 3.4% increase in productivity (Goldstein & Ford, 2002). Pasternack and Viscio (1998) give a commercial company that spends almost $100 million on education and training as an example and calculates a 300% return on investment annually. On the other hand, some still see training as a necessary interruption to work and productivity and do not place a high value on training. It is also thought by some researchers (for example, Singh and Katiyar), that training might not be so effective in improving the performance at work. They argue that training does not achieve the results in proportion to the time,

resources, and money used for it. One of their reasons is that there have been lesser attempts to update training in accordance with changing business and organizational needs. It is also important to articulate that measuring the value of training in an organization is difficult.

Craig (1976) lists nine reasons for organizational training in an organization (as cited in Udoh-Ilomechine, 2009):

- Increase in productivity
- Improvement in the quality of work and morale
- Development of new skills, knowledge, understanding, and attitude
- Correct use of new tools, machines, process methods, or modification thereof
- Reduction of waste, accident, turnover, and other overhead costs
- Fighting of obsolescence in skills, technologies, methods, products, markets, and capital management
- Bringing incumbents to a level of performance for the job
- Development of replacements, preparing people for advancement, improving manpower development, and ensuring continuity of leadership
- The survival and growth of an organization

According to Pasternack and Viscio (1998), in today's fast-moving world, organizations should make it a priority to develop the knowledge, skills and attitudes required by employees. According to Kaplan (as cited in Funk & McBride, 2000, p. 550):

> The digital age will significantly change the nature of work, the job skills required, how people learn new job skills, and the role and curriculum of learning. As stated earlier, an electrical engineer's

> education is easily outdated within eight years after graduation from college, while a medical doctor's education is dated within five years."

This shows that personnel training in organizations will play a more crucial role in the following years and decades. Organizations in the pursuit of success will need to continue to invest significant amounts of time, energy, and resources to increase the quality of their human capital.

According to Goldstein and Ford (2002):

> Workplace training is a systematic approach to learning and development to improve individual, team, or organizational effectiveness. A systematic approach refers to the idea that training is intentional. It is being conducted to meet a perceived need. Learning and development concerns the building of expertise as a function of these systematic training efforts. Learning outcomes can include changes in knowledge, skills, or attitudes (KSAs). Improvement is measured by the extent to which the learning that results from training leads to meaningful changes in the work environment. Therefore, a critical issue is the extent to which the KSAs are transferred to the job and improve individual effectiveness. (p. 22)

They stressed that a systematic approach should be taken to training. A systematic approach to training and learning looks at training from a broader, more macro perspective since training not only improves individual effectiveness but also improves organizational performance. In this way, training should be perceived as integral to facilitating larger scale organizational change and development issues (Goldstein & Ford, 2002).

Instructional systems development (ISD) is one of the approaches in training development. It provides a detailed methodology for the assessment, evaluation, design, production, implementation, and maintenance of effective training programs. Tennyson and Foshay (2000) propose the following ISD model:

- Stage 1: Diagnosis/Needs Assessment
- Stage 2: Design

- Stage 3: Production
- Stage 4: Implementation

Another systematic approach is the assessment, design, development, implementation, and evaluation (ADDIE) model (Bogardus, 2007). According to Tobias and Fletcher (2000):

> In training programs, there is an emphasis on efficiency in achieving level of knowledge and skill as quickly and inexpensively as possible. The principles underlying the design, development, implementation, and evaluation of training programs reflect this emphasis. (p. IX).

B. INSTRUCTIONAL APPROACH TO TRAINING

According to Bosco and Morrison (2000), training can be conceived as one of several different methods and techniques that enhance job performance. They state that these methods and techniques provide an important conceptual context for training. Despite the fact that there are a noticeable amount of academic disciplines related to training, as Tobias and Frase (2000) state, training relies substantially on educational and learning theories. Mikulas (1974) states that “Performance is the interaction of learning and motivation” (p. 5). According to Adrian (2002), in order to develop an effective learning environment some basic concepts of learning theories should be comprehended. As Tobias and Fletcher (2000) point out, both training and education are on the same dimension, which together are called learning. They try to exploit knowledge in their own unique environments. They aim at the same point, which is to achieve learning. Similarly, Havelock and Havelock (1973) maintain that in addition to some experimental research and practical experience, a good deal of research and theory in training originates from basic research on learning. According to Funk and McBride (2000), “the process and methods of learning in training and education will change and begin to merge” (p. 550). According to Tobias and Fletcher (2000), researches and developments in educational settings substantially influence training and vice versa and thus can use similar

instructional methods, material, models, approaches and theoretical contexts. Based on this, modern learning theories are examined. There is a broad range of learning theories regarding how people learn. These theories and concepts can be used in training activities. In order to make effective training courses that will develop knowledge, skills, and attitudes required by an individual to perform a given task or job (Armstrong, 1997), various learning theories are reviewed.

Today's technologies present new environments that will enhance learning. However, the challenge is how to exploit learning opportunities offered by these technologies. Palin and Sandhaas (2000) outline how to design, develop, and implement an effective instructional environment. They outline human learning by focusing on cognitive science. They state that analytic cognition, synthetic cognition, and analogical thinking are the fundamentals in the learning process. They define learning as a discriminate ordering of experience. Humans appear to process an experience either by grouping it with other experiences that seem to share similar characteristics (synthetic cognition), or they break the experience into component parts and seek to find an internal pattern that is recognizable (analytic cognition). In some cases, humans combine analytic and synthetic approaches (analogical thinking) which, generally, are the sources of creativeness. It can be concluded that instructional programs should take instructional cognition theories into consideration in the process of designing instructional materials.

For instance, Ausebel's (1963) theory explains the development of instructional materials that present information in a particular way and order so that meaningful learning can be maximized when the learners integrate and interrelate prior knowledge to new information. This can be achieved with the use of advance organizers such as an introductory discourse, a preface, etc., that will explain, integrate and interrelate the content of new information with existing knowledge. Similarly, Inglis et al. (1999) believe that "when learners receive information they do not receive knowledge but rather construct knowledge from it" (p. 27). The key is not just transmitting information, rather presenting it in a

way to help learners in their learning process. However, this practice entails active participation of the learner. Instructional studies also show that instead of passive spectatorship, active participation motivates learners and increases learning. An inadequate amount of active participation by the learner may diminish the learner's motivation and learning activity (Brown, Lewis, & Harcleroad, 1959). In a classroom environment, active learning can be accomplished with the interaction between instructor and learner. According to Vanbuel, Boonen, and Scheffknecht (2000), "As an emerging technology, the level of interactivity in Web-based training is often quite limited" (p. 114). In an online environment, using multimedia can promote an active learning environment (Smith, 2006).

Knowles (as cited in Kruse & Keil, 2000, p. 89) suggested that how adults learn (andragogy) and how children learn (pedagogy) are different. According to Knowles, Holton and Swanson (1998), adults have a deep need to be self-directing and they are more motivated as they experience needs and interests. They also posit that experience is the richest source for adults. According to Adrian (2002), adult learning is primarily achieved with an elevated degree of immersion or hands-on practice and teacher-student dialogue. It can be concluded that in order to develop an effective training course, specific efforts must be paid to elevate trainee immersion or hands-on practice or trainer-trainee dialogue.

Kovalchick and Dawson (2004) point out that "Because motivation affects learning and performance outcomes, it is important for instructional designers to understand how to use specific design strategies to increase learners' motivation" (p. 34). Keller's attention, relevance, confidence, and satisfaction (ARCS) model provided a method for sustaining and promoting motivation. According to Kovalchick and Dawson (2004), the ARCS model provides a useful base as one looks for new ways to promote learning with the use of new educational technologies such as Web-based instruction.

The elaboration theory provides an organizational strategy of selection, sequencing, synthesizing, and summarizing of the subject-matter content. The theory argues that the instruction starts with a simple overview comprised of fundamental ideas, then gives detailed ideas progressively as well as subsequent ideas (Reigeluth, 1983).

It is also important to provide instructional materials in a variety of formats, since people have different learning styles (Cooper, 2002). Sensory stimulation theory argues that for effective learning a person's senses should be stimulated. As McClelland (1995) states, "It emphasizes a hands-on approach to learning by actively involving participants through the application of a variety of sensory stimuli" (p. 195). People use mostly their seeing and hearing senses when they learn. Seeing is the most effective sense and 75% of a person's learning occurs through seeing. While hearing constitutes about 13% percent, other senses form the remaining 12%. Learning can be enhanced by stimulating the senses, which can be achieved by a variety of techniques such as audio-visual aids (Laird, 1985). It can be concluded that in the designing process, different techniques and methods can be utilized to stimulate human senses, which will lead to effectual training results.

According to Goldstein (2002), to maximize learning potential, training designers must examine the methods and techniques available and choose the training approach most appropriate for the behaviors being trained. This chapter reviewed the relevant learning theories.

C. MEDIA SELECTION AND NETWORK-BASED TRAINING

> For tens of thousands of years, human beings have come together to learn and share knowledge. Until now, we have had to come together at the same time and place (Horton, 2000, p. 1).

However, technological advances are changing the place, time, and way of training (Colteryahn & Davis, 2004). Even though traditional training, which refers to face-to-face interactions between trainer and trainee, is the major method for satisfying the training needs of organizations, new training delivery

methods and new media have appeared in recent decades. According to O'Connor, Bronner and Delaney (2002), there are two delivery approaches of training. The first delivery approach is live instruction, which is instructor-led, face-to-face, or the traditional way of training, and the second approach is mediated instruction, which is delivered by some form of medium rather than a live instructor (O'Connor, Bronner & Delaney, 2002). It is thought by some theorists (for example, Goldstein [2002]) that traditional media will continue to be the main delivery method, at least for a time. He states that according to a survey, 84% of all training is delivered through traditional methods (Goldstein, 2002). On the other hand, he also states that there is an increasing trend in the use of new technologies in organizational trainings. According to Hickey (1968), the trend toward individualized instruction, the growth in information to be acquired, and the shortage of qualified instructors make the utilization of new technologies inevitable. According to Megill (1997), "Learning in a technological environment is becoming more and more important as traditional training turns out to be expensive and, often, transitory. Organizations are beginning to look at various ways to solve the problem of introducing technology into the workplace" (p. 74).

The following are the emerging training systems Goldstein (2002) outlined:

- Distance learning where training is delivered across multiple sites at one time
- Virtual reality training where trainees can view a 3-D world of the kinds of situations they might face on the job
- Computer-based training (CBT) where trainees can respond to training materials on CD-ROMs
- Intelligent tutoring systems where training can be customized to meet individual training needs through extensive testing and branching of training materials

- Web-based training that allows for more self-instruction and learner control because instruction is sorted and transmitted as requested by trainees from remote sites and accessed via the Web.

The most important question that needs to be answered is what is the most effective media for training delivery, and how can it be selected amongst all the alternatives. In the literature, an abundant number of media selection models exist. Some models try to establish their selection criteria according to task types, individual differences, and training components. For example, in a cooking training course trainees should use their own individual senses. A traditional media may be the best or most appropriate media to deliver a cooking course. Some other models try to select according to the cost, duration, pace, accessibility, and effectiveness of trainings.

Kemp, Morrison, and Ross (1994) suggest that there are three different approaches to media selection (as cited in Tobias & Fletcher, 2000):

- Selection based on what is readily available
- Selection on the basis of what a trainer is most familiar with or most comfortable using
- Selection on a more objective basis whereby some guidelines can be followed so that selection can be justified in a non-subjective manner

Sugrue and Clark (2000) address various approaches for the process of media selection. They regard existing media selection models as a two-stage process. They state that “The first stage involves the selection of a set of candidate media to match task, trainee, and instructional event characteristics. The second stage involves selecting among the candidates based on practical considerations such as relative cost and convenience” (Sungrue & Clark, 2000, p. 216). They also suggest that these models mostly depend on subjective reasoning and one should support a model with theoretical contexts. Their three-stage cognitive approach to select a delivery media has the following steps:

- Selection of training methods to support cognitive processes
- Selection of media attributes to facilitate the delivery of training methods
- Selection of the most economical and convenient set of media

Sungrue and Clark (2000) concluded that, as the media available for training become more and more sophisticated, as any medium or mix of media is capable of delivering training with similar effectiveness, the best use and best combination of technologies will be the least expensive and the most accessible media that includes all the attributes needed to deliver training and give the level of external support for cognitive processing selected for the training.

As Sugrue and Clark (2000) state:

> The relative costs of different media combinations will depend partly on the size of the audience for the training and the extent and efficiency of the development systems and facilities available. If the audience for training is small, then media that require less time-consuming up-front development, such as, human trainers with some print materials, may be preferable to computer-based training. However, if a company has shells or templates for creating Web-based or multimedia training that embodies appropriate types and amount of external support, then computer based training may always be the least expensive option in that organization. (p. 208)

One of the United States Department of Defense's strategies is to ensure that all military personnel have access to the highest quality education and training. An advanced distributed learning (ADL) plan provides a federal framework to provide high quality instruction that can be tailored to individual needs and delivered cost-effectively. The implementation of the plan creates an anytime, anywhere learning environment which will help prepare a competent workforce for the future. The Department of Defense develops strategic training plans that guide effective training programs that take full advantage of new technologies and new human performance improvement methodologies. The U.S. Coast Guard's Advanced Distributed Learning Plan (CGADLP) is designed to establish a learner-centric system. This system employs emerging network-

based technologies which will deliver efficient and effective high quality tools and instruction to Coast Guard personnel anytime, anywhere. Various proven technologies that the U.S. Coast Guard has identified are listed below:

- Electronic performance support systems and technical manuals
- Interactive courseware/computer-based training
- Interactive video tele-training
- Web-based delivery (Department of Defense [DoD], 2000)

Networks such as the Internet/Intranet and computers can provide the connection between trainers, trainees, and training resources and make interaction possible. This instructional method is called network-based training. It is also called Web-based training, online instruction, and learning over the Internet/Intranet (Alden, 1998). According to Horton (2000), the usage of Web-based technologies in training is advancing rapidly and growing exponentially. There are two basic modes of network-based training. The first mode is called synchronous, in which all three inputs (trainers, trainees and training resources) are connected at the same time, and the second mode is called asynchronous, in which inputs are connected at different times. Since synchronous connection is hard to accomplish asynchronous mode is the most common approach to network-based instruction (Alden, 1998).

According to Inglis et al. (1999), the change in eras demands lifelong learning that cannot be satisfied with traditional ways. Adopting new approaches and utilizing new technologies are necessities more than options. They also state that “Most investigations of new learning technologies indicate no significant difference in learning outcomes where new technologies are employed” (Inglis et al., 1999, pp. 20-21). Alden (1998) maintains that capabilities of networks such as the Internet and Intranets can be applied appropriately to training without a major investment. Network-based training may help either increase learning, enhance availability or reduce training-related expenses, or all three.

However, it cannot be concluded that there is a best method of delivering training. It cannot be said that any delivery method is better than the other one.

Each method has its pros and cons. Organizations may use different methods and they may also use a blend of delivery methods. There are various factors in the media selection process. Trainers should choose the best delivery method that will maximize the effectiveness and efficiency of training programs. Furthermore, the selection method should factor in the cost of the training and costs savings of each delivery media. LaBerra and Wilson (2002) assert that higher satisfaction, greater learning, higher enthusiasm, fewer interpersonal interactions, lower information confidence and motivation, and individual, task, context dependencies are several aspects of asynchronous instruction over traditional instruction. Web-based delivery uses a multimedia approach and costs are minimal and it is similar to traditional delivery in scope and duration. On the other hand, it can be stored for later use in an asynchronous environment. It also prevents the loss of personnel away from his/her unit for the training.

According to Schreiber (1998), deciding what technology to use and how to use it effectively are crucial issues faced by organizations, and for effective implementation of distance training, organizations should not only have technological capabilities, but also strategic plans to manage an organizational change. Schreiber and Berge (1998) suggest a model for developing distance training.

Schreiber and Berge (1998) state the following:

The goal is to maximize utilization of technology and institutionalize an organization's distance training efforts:

- Analyze business needs,
- Identify strategic distance training events and programs,
- Apply conceptual frameworks of learning to distance training,
- Identify and select delivery tools (develop organizational technology delivery tools,
- Correlate distance learning instructional materials to technology delivery tools,
- Secure implementation support,

- Implement a balanced roll-out strategy, and
- Evaluate distance learning processes and measure transfer. (p. XVII)

New technologies provide a more flexible presentation of materials to the learner. These technologies can also be used to track user performance and progress (Bower & Hilgard, 1981). According to O'Connor et al. (2002), when a large audience is spread out geographically it may be appropriate to use non-traditional delivery methods. Similarly, Salmon (2004) states that a network can be a useful delivery method for organizations whose employees are geographically distributed at different locations.

Following are various reasons, according to Alden (1998), why an organization might use Web-based training:

- To reduce travel expenses
- For outreach to other trainees
- To improve training quality
- To improve training efficiency or timing
- To boost the image of the training organization

Following are the situations, according to Alden (1998), in which Web-based instruction makes sense from a business and instructional perspective:

- If the organization has high expenses associated with the transportation and accommodation of people attending training programs
- If it is difficult for many of the trainees to break away from their business and attend a traditional training program if the organization already has the Web or an Intranet connection available to their employees
- If the critical content of the program can be easily transmitted with words, pictures

- If the prospective trainees are highly motivated
- If the content of the program changes rapidly

The United States Defense Acquisition University (DAU) is the corporate university that provides practitioner training and service for the U.S. armed forces. It offers basic knowledge courses online, instead of taking people out of their workplace and sending them off to a training facility. However, in their intermediate and advanced courses they blend online materials with traditional classroom-based and instructor-led materials. Most executive-level courses are delivered the traditional way (Salopek, 2004).

Alden (1998) points out the key factors to consider before moving to Web-based instructions: “Web-based training makes sense if the following situations exist:

- Costs are high using traditional training methods.
- Some key students can’t make it to the classroom.
- Access to an Intranet/Internet exists and support is available.

The program’s content and activities are appropriate for the Web.

- Participating students really want to complete the training.
- Course content must be updated frequently.” (Alden, 1998, p. 2)

As stated above, one of the major reasons why organizations use a Web-based training system is the potential for costs savings (Inglis et al., 1999). However, according to Boettcher (2000), the question of how much it will cost to establish such a system has no simple answer because cost depends on organizational variables. An organization can spend as much or as little as it desires since each organization is unique and has its own attributes and abilities. As a consequence, a cost-benefit analysis is a preferred method to justify any training system.

To evaluate Web-based training, not only advantages and benefits but disadvantages and limitations should be considered. One of the limitations may be the substantial infrastructure required in a Web-based training system (Driscoll, 1998; Horton, 2000). The lack of human contact can be another limitation (Kruse & Keil, 2000). According to Horton (2000), Web-based training may require more instructor and learner effort and converting courses into a digital environment may be demanding and time-consuming. Furthermore, Web-based training may not be appropriate for teaching psychomotor skills (Driscoll, 1998). According to Steed (1999), network bandwidth limitations may restrict instructional methodologies.

D. NEEDS ASSESSMENT

The most crucial step before starting any activity is to evaluate its need. Cascio (1994) states (as cited in Goldstein & Ford, 2002, p. 34):

> As both economic conditions and technological developments change rapidly, the ability to adapt to these changes becomes the essence of the future competitiveness. Adaptation involves three processes:
>
> - Identifying the areas needing change,
> - Planning and implementing the actions necessary to make a change,
> - Evaluating the effectiveness of the changes. (p. 34)

According to Rouda and Kusy (1995):

> The largest expense for HRD programs, by far, is attributable to the time spent by the participants in training programs, career development, and/or organization development activities. In training, costs due to lost production and travel time can be as much as 90-95% of the total program costs. Direct and indirect costs for the delivery of training are about 6% of the total cost, and design and development count for only about 1-2% of the total. Realistically, it makes sense to invest in an assessment of needs to make sure we are making wise investments in training and other possible interventions. (para. 4)

Training needs assessment is the process before the training implementation process. This process determines what employees need to learn in order to perform their jobs successfully, to grow their careers, and to carry out the organizations' plans and achieve their goals. Not only to identify performance deficiencies, but also to determine those that can be cured with training is the crucial part of the needs assessment process. Otherwise, the result can be a waste of valuable resources (O'Connor et al.). According to O'Connor et al. (2002), the needs assessment process can be considered a systematic approach at organizational, task, and individual levels. Organizational analysis examines the training needed as organizations change and ensures that training is done for the right topic, and it also ensures that the training outcome can be conveyed into the workplace. Task analysis compares job requirements with an employee's knowledge, skills, and abilities to accomplish the job. Individual analysis provides an understanding of the characteristics of the individuals within the target training population (O'Connor et al., 2002).

Rouda and Kusy (1995) assert the following four steps in order to conduct a needs assessment:

- Performing a gap analysis: the difference between the actual and the desired performances determines the need and objectives
- Identifying priorities and importance: this step analyzes if the identified needs are real and specify their importance and urgency; a cost-benefit analysis can be performed
- Identifying causes of performance problems and/or opportunities: this step requires detailed investigation and analysis at individual, task, and organizational levels to specify the root causes
- Identifying possible solutions: this step analyzes whether the training is the best solution.

Goldstein and Ford (2002) claim that “a training needs assessment is the diagnostic X-ray film for the training analyst” (p. 35). They present a model of the components of the needs assessment process (Goldstein & Ford, 2002).

- Organizational support:
  - Establish a relationship with top management
  - Establish a relationship with other organizational members
  - Form a liaison team
- Organizational analysis:
  - Specify goals
  - Determine training climate
  - Identify external and legal constraints
- Requirements analysis:
  - Define the target job
  - Choose methods
  - Determine participants
  - Determine points of contact
  - Anticipate problems
  - Develop a protocol
- Task and knowledge, skills, and abilities (KSA) analysis:
  - Analyze tasks and KSAs
  - Develop tasks
  - Form task clusters
  - Develop KSAs
  - Determine relevant KSAs and tasks
  - Link relevant KSAs to tasks

- Person Analysis:
    - Develop performance indicators
    - Determine KSA gaps in the target population
    - Determine the approach to resolve gaps

It is crucial to collect current information about the job in the needs assessment process. Some of the needs assessment techniques Steadham (1980) suggested are listed below (as cited in Goldstein & Ford, 2002):

- Observation
- Questionnaires
- Consultation with key people
- Print media
- Interviews
- Group discussion
- Tests
- Records, reports
- Work samples

Even though a needs assessment process primarily determines the deficiencies, for example, what area/areas need change and what employees need to learn, it is the author's contention that if multiple delivery methods are employed in organizational trainings, the needs assessment process can also help determine the appropriate delivery method. A needs assessment can explore the desired results systematically for a networking technology and determine whether the new technology will satisfy the needs. With a needs assessment, the effectiveness of a network-based training system is evaluated so that establishing the proposed system can be justified. It can be concluded that the needs assessment process presents all the critical inputs for the design

of the training environment. Needs assessment data can provide valuable indicators about which type or types of instructional methods to use (McClelland, 1995).

E. CRITICAL SUCCESS FACTORS AND REQUIREMENTS

There are several key elements, critical success factors, for the success of any system. For instance, Information technologies (IT) has become a critical success factor for many organizations. Training is a critical success factor for increasing the performance of organizations. Just as other systems, implementing network-based training requires critical success factors. Berge & Smith (2002) recognize three critical components to change the way training is done in organizations, as they state that to change the way training is done, change management, strategic planning, and project management should be applied to a network-based training system.

Change management - Every organization has some level of resistance to change. Overcoming this resistance requires an effective change management program (Porter et al., n.d.). Change management provides the context for implementing new projects. Porter et al. (n.d.) suggest that change management should focus on the human nature in a business environment and provide guidelines for managing the human side of implementing distance instruction. They also suggest that factors that affect the adoption of new innovations must be determined and factored in planning so that people can explain, predict, and account for those issues that facilitate or impede an organization's acceptance of the innovation. Moreover, they articulate the notion of cultural change. More often than not, implementing new technologies such as untraditional training is considered a cultural change or organizational development initiative. Finally, competency in change management creates and improves the context for implementing new technologies (Berge & Smith, 2002). A strategic vision is remarkably important in the change process and a change agent should guide the change effort (McShane & Von Glinow, 2009).

Strategic Planning - Strategic planning puts the conditions or constraints on the organizations in which new technologies are implemented. Wagner (as cited in Berge & Smith, 2002) argued that organizations should consider the big picture on how implementing new technology will change the organization. Organizations also need to ask questions up front to address crucial issues like needs, cost-benefits, technical requirements, infrastructure, resources, audiences, design, delivery, communication, incentives, and support (Wagner, 1992).

Project Management - Every organization has problems and needs which should be solved in a cost-effective way. Projects are generally established to solve problems and respond to needs within an organization (Heerkens, 2001). To implement a new technology successfully and change the way training is done requires project management tools and techniques (Berge & Smith, 2002). Heerkens lists the following eight steps in a project management process:

- Identify and frame the problem and the opportunity
- Identify and define the best project solution
- Identify task and resource requirements
- Prepare the control schedule and resource allocation plan
- Estimate the project costs and prepare a project budget
- Analyze risk and establish stakeholder relationships
- Maintain control and communicate as needed during execution
- Manage to an orderly close-out

According to Wang, Xu, Chan, and Chen (2002), establishing a successful Web-based training system entails leadership support. Similarly, according to Baxter (1993), strong administrative support for the project to encourage program success is crucial. French and Bell (1999) point out that (as cited in Goldstein & Fletcher, 2002), if top management does not clearly understand the goals and strategies of a Web-based training system, then the process may be vulnerable. According to Driscoll (1998), designing Web-based training is a team effort and

requires many team members with specialized skills. According to Vanbuel et al. (2000), “the team to implement and develop Web-based training can range from one enthusiastic and very dedicated person who does it all, to project teams of over 40 professionals” (p. 108). The team may consist of a project manager, instructional designers, programmers, graphic artists, subject matter experts, and Webmasters (Vanbuel et al., 2000).

According to Wang et al. (2002), a successful Web-based training system requires effective IT infrastructure. Stone and Koskinen (2002) noted the following various issues pertaining to infrastructure needs:

- Organizational IT standards
- Current and required LAN topology
- Current and required standard platforms
- Network capacity (bandwidth)
- Current and required media software and hardware
- Current and required infrastructure maintenance
- Security issues

According to Steed (1999), Web-based training does not require a significant amount of expenditure if the organization has a network.

F. NETWORK-BASED TRAINING DESIGN

Today’s technologies present new environments that will enhance learning. However, the challenge is how to exploit learning opportunities offered by these technologies. The presentation of information is one of the most crucial elements of network-based training. The point is how the information can be displayed on the screen in a most effective way. There have been numerous literatures about designing a network-based training course, most of which focus on computer screen design. It is necessary to understand computer screen

design and its cognitive effects. Palin and Sandhaas (2000) point out that one should take instructional cognition theories into consideration in the process of designing training materials.

The Web provides a rich environment for presenting information that can be used in designing training courses (Alden, 1998). According to Inglis et al. (1999), a rich learning environment is created through the effective use of multimedia. Berry (2002) states that “The World Wide Web is an exciting and powerful tool for learning, but only if we know how to make it effective” (p. 106). Berry (2002) suggests two cognitive aspects of screen design. The first one is the process of how the information is perceived and the second one is how the information is encoded into memory (Berry, 2002). Palin and Sandhaas (2000) posit that “Network based learning is multisensory in that it may employ a variety of visual and auditory elements to reinforce learning. In the future other senses may also be facilitated, but over the network it is already possible to apply much more media specifically relevant to learning than is usually the case in traditional learning environments” (p. 58). They also suggest that a network-based training course should offer an environment for presenting information with sights and sounds carefully selected to enhance the learning process.

According to Alden (1998), text, simple graphics, artwork and photographs, animations, audio and video, and 3-D graphics are some of the popular ways of presenting information. Text is the principal way of instructional communication in an online environment. Electronic text has certain advantages and disadvantages (Hartley, 1985). Reading text from a screen raises the question about reading speed. Reinking and Bridwell-Bowles (1996) state various researches whose findings are mixed. There is some evidence that reading speed is slower for text displayed on a screen. According to Steinberg (1984), the amount of text presented on the screen should not be as excessive as in a classroom environment. His reasoning is that learners tend not to read the material if the entire screen is filled with text. Graphics, pictures, animation, and audio and video can be useful in explaining and demonstrating ideas and

concepts which are difficult with text. Because of its lower requirements of bandwidth and low cost compared to video, audio is more popular (Kouki & Wright, 1999).

There are various presentation software packages. Microsoft PowerPoint is the most popular and common one. It is widely used in business and instructional environments and it supports all the media stated above (Rivers, Joseph, Gunter, Kettell & Kettell, 2009). When designing multimedia presentations, the most appropriate media should be chosen. “Sometimes a picture is worth a thousand words, sometimes a few words are worth a thousand pictures; and sometimes, in the case of a struggling reader, for example, spoken words are more important than anything else” (Marcovitz, 2004, p. 2). Marcovitz also asserts that “Some people are primarily visual learners, auditory learners, or kinesthetic learners, but most of us are combination of all three. Using different senses increases attention, motivation, and, in many cases, learning” (Marcovitz, 2004, p. 2). According to Kinder (1965), “Good instructional materials should be properly prepared, wisely selected, and intelligently used” (p. 33). O’Rourke, Sedlack, Shwom and Keller (2008) suggest the following guidelines when presenting information in a presentation program:

- Use a simple look
- Use basic, solid backgrounds
- Use contrasting color for headlines and text
- Use simple bullets
- Employ a coherent set of fonts
- Keep font sizes consistent,
- Position headline flush left and use sentence case
- Include slide numbers
- Write a headline that creates expectations
- Design the slide content to fulfill headline expectations
- Leave plenty of white space
- Follow best practices in design of visual elements

- Keep text easy to read

It is important to point out that a good design also requires successful use of colors. The results of various studies have shown that different colors have different physiological effects. It has been shown that color also affects the way humans process information. Using colors properly can improve the learning process; on the other hand, if colors are used improperly, it may have opposite effects. Color is an important factor in retention since it may enhance the ability to remember numbers, words, and pictures (Myers, 2004). Myers also suggests that colors can capture the attention of learners, for example, by giving important objects, words, and phrases a bright color. If used badly, for example, using colors overwhelmingly, colors can distract the audience and messages can get lost and impede the learning process (Myers, 2004).

When establishing a training course in a network environment, security becomes a very crucial requirement. In order to ensure a secure environment, organizations should take necessary precautions (Kouki & Wright, 1999).

While the contents and subjects are the main consideration of distance learning, the effective presentation of information has a significant impact on the learning process (Alden, 1998). The presentation of information is one of the most crucial elements of network-based training. The point is how the information can be displayed on the screen in a most effective way. A good computer screen design can enhance the learning process; on the other hand, if it is designed badly, it may have opposite effects.

G. SUMMARY

Not only is the importance of training increasing but new training methods are also emerging. The advent of new technologies is facilitating new alternatives for satisfying the training needs of organizations. Even though traditional instruction may be the primary method, network-based training systems are becoming a favored training option. A network such as an Intranet or the Internet can be used either in place of traditional methods or as a supplemental method

in organizational trainings. This literature review shows that media selection involves considering the effectiveness of each method. Furthermore, the selection method should factor in the cost of the training and costs savings of each delivery method. The results of various studies have shown that network-based instruction can be as effective as traditional instruction. Most of the previous literature has different remarks regarding costs because cost issues depend on each organization's own variables. This means that each organization is unique and has its own attributes and abilities. As a consequence, a cost-benefit analysis is a preferred method to justify any system. Any system justified with a cost analysis can uncover internal waste and inefficiency and promote productivity and efficiency (Coombs & Hallak, 1987). After deciding what system to use, how to use it effectively is a crucial issue faced by organizations. A systematic approach should be taken to establish a network-based training system, and for the effective implementation of distance training, organizations should not only have technological capabilities, but also strategic plans to manage an organizational change.

III. ORGANIZATIONAL ANALYSIS

A. ESTABLISHING THE PROPOSED SYSTEM

This section will describe the components and attributes of a network-based training system and identify its benefits and limitations.

1. Purpose

Developing and maintaining technology-based training/learning systems, such as Internet- and Intranet-based systems, is a new and dynamic area of interest within business, governmental, academic, and military organizations. This chapter will analyze the usage of network-based learning/training technologies in the Turkish Coast Guard Command as a supplemental method to traditional face-to-face training systems. Evaluating the proposed system involves a description of the project as well as identifying and analyzing the costs, benefits, and limitations of it. In order to accomplish the analysis objectives, which is examining the potential impact of establishing a network-based learning/training system in the Turkish Coast Guard Command, the author conducts a project management process. To find out whether the proposed system can reduce training-related costs in the organization, a feasibility study and a cost benefit analysis is performed. As examined by Schreiber and Berge (1998), the objective is to maximize the utilization of constructive technology and institutionalize the organization's initiatives. Structuring a comprehensive analysis will assist management in making better decisions about the proposed project.

2. Background

To improve the performance of Coast Guard personnel consisting of officers, petty officers, contracted enlisted personnel and civilian employees, the organization has been offering numerous training programs. In addition, the Coast Guard Command has taken additional steps in order to support its training

policy. Considering all training methods, the Coast Guard Command focuses heavily on traditional instruction as a delivery option to deliver learning. Learning is the culmination of education, training and leadership. An instructor gives a face-to-face lecture to the assigned trainee personnel in a designated classroom environment. In addition, the instructor utilizes a full range of typical instructional methods to convey the learning objectives for his/her particular subject expertise (Sorenson, 1998). Pros and cons exist with traditional instruction. Some of the cons of the traditional approach include:

- Classes are held only at fixed times and specific places
- Require personnel to be away from their work places during learning
- Traditional instruction usually incurs high travel costs to execute.

These issues, coupled with budget limitations, have compelled organizations to alter the way they train their employees. Innovations in IT have added different kinds of training possibilities such as computer-based and network-based training systems. These technological IT advances may present a partial solution to high travel costs and lost work time by providing faster, cheaper, and better training (Inglis et al., 1999). A network-based training system is one of the technological advances that change the time, the place, and the way of training (Colteryahn & Davis, 2004). As traditional training becomes even more expensive, organizations must incorporate new training systems in their workplaces. However, management should investigate the viability and cost/benefit issues. Accordingly, establishing such a system in an organization would entail a systematic project management process including initiation, planning, execution, and closure phases.

3. Training Delivery Alternatives

The first step in the analysis is to identify available alternative systems. Two available alternatives for the Turkish Coast Guard to deploy are maintaining the current system or establishing a new training system. First, it is clear that the Coast Guard can maintain the existing traditional system, which involves the

central training facility, to deploy trainings with formal programs. The second alternative is a blended training system, which consists of developing and maintaining a network-based training system that involves using existing Intranet infrastructure of the organization to provide online training as a supplemental method to the existing traditional training. Even though there are other technologies available, one of the best choices can be network-based training technology. The following must be considered as selection criteria:

- The organization already has the Intranet connection available to their employees (Alden, 1998)
- Personnel are geographically distributed at different locations (Salmon, 2004)
- Work responsibilities makes it difficult for trainees to attend a traditional training program
- The program's content and activities are appropriate for the Web (Alden, 1998).

Alden (1998) maintains that an organization can apply network capabilities such as the Internet and Intranets to training in an appropriate manner without a major investment. An organization's existing Intranet infrastructure and computers provides the connection between trainers, trainees and training resources and makes the training possible (Alden, 1998). This network can be a convenient and practical delivery medium for the organization when considering geographical dispersion of the personnel.

4. The Structure of the Proposed System

Figure 1 illustrates the proposed system and its elements. The defining characteristic of the network-based training is that the network such as the organizational Intranet or the Internet separates the trainee and trainer (Berge, 2001). The learning happens in an environment different from a classroom such as workplace. On the other hand, traditional training requires personnel to be in a certain training facility, mostly away from their place of work, during certain

training periods. The capabilities of a Web-based system remove the limitations of traditional classroom training. It translates to the reduction or elimination of time spent away from the job by personnel.

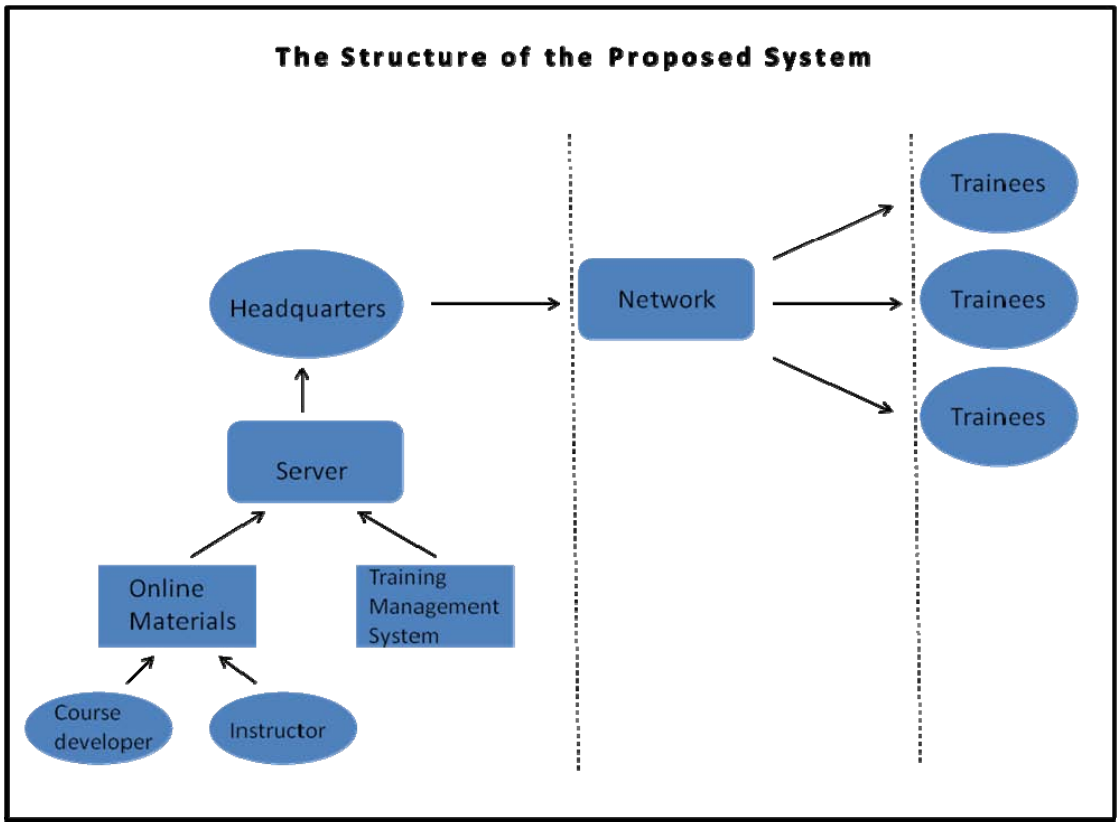

Figure 1. The Structure of the Proposed System.

5. The Components of the Proposed System

To understand the proposed system, first, identify the sequence in which the components of the system should occur. The proposed system components are trainees, materials, trainers/instructors, course developers/instructional designers and network infrastructure.

a. Trainees

Trainees are the individuals who will develop knowledge, skills, and attitudes through the proposed training system. They are the personnel of the

Coast Guard, and include officers, petty officers, and civilian and enlisted personnel who either serve in its military units on board or on shore, assigned to a specific training course. One of the key aspects of trainees is that there is geographical dispersion among them. Instead of being information-centered, network-based training is learner-centered, which means that it requires more engaged, committed, and motivated trainees who will actively participate in the training and be involved in the learning process (Lawson, 2006). Trainees reside at the physical location where the work that the training supports.

b. Materials

A network-based training system provides a rich environment for presenting information used in designing training courses (Alden, 1998). Text, photographs, animations, audio and video, and 3-D graphics are some generally accepted methods to present information when developing online course materials. It is critical to carefully plan any material production. Producing online materials from scratch is sophisticated and time consuming. According to Driscoll (2002), although existing course materials are a good starting point, avoid using existing traditional course materials without revisions. Developing materials can require a team effort. Trainers/instructors and course developers should be included in the preparation of course materials.

c. Trainers/Instructors

Trainers should be the professionals or subject matter experts on any given subject. Most organizations that introduce online technologies plan to use their current faculty as the online instructors. According to Horton (2000), “The fundamental responsibility of the instructor does not change. Instructors still create an experience that causes someone else to learn” (p. 6). However, developing materials for an online course is different than developing classroom course materials. Accordingly, current instructors may need some kind of training in order to equip themselves with the skills needed for developing online course materials.

d. Course Developers/Instructional Designers

Course developers/instructional designers – Creation of online materials should happen in a way that students become actively involved in the learning process. When developing materials, choosing and using the right media to present information is the key issue. Developing online courses requires specialized expertise in this subject. Course developers/instructional designers are responsible for designing and developing course materials. To develop course materials, course developers/instructional designers should work with instructors jointly.

e. Network Infrastructure

In order to deliver online courses, there needs to be a network between trainees and trainers. Both the Internet and Intranet are possible choices for delivering training courses. A Web-based training system is constrained by the limits of the organization's infrastructure, such as modem speed, version of browser software, security regulations, bandwidth, and hardware configurations (Driscoll, 2002).

(1) Hardware resources

The following are hardware requirements for the proposed system:

- Servers: The organization needs a server that is going to be dedicated for the proposed system to run the software applications.
- Computers: Trainees will need computers that will enable themselves to take online courses. Computers also need to be equipped with the appropriate hardware and software.

(2) Software resources

Several vendors offer a variety of online distance learning software products. Despite the costs, these software programs may simplify

developing and maintaining online courses (Alden, 1998). The organization can acquire software either by getting hosting services from an application service provider (ASP) or by purchasing the application (Driscoll, 2006).

Driscoll (2006) states that the following several categories should be considered as part of integrated online training products:

- E-learning delivery platforms
- Learning management systems
- Learning content management systems

6. General Description of the Project

Several key elements must exist to ensure the success of any proposed system. One of the first major decisions the organization is confronted with is whether to use a Web-based training system at all. A needs analysis will help in the decision-making process. Before the organization commits to this technology, it should consider the advantages and disadvantages and assess requirements of the system. The organization should also estimate the costs and make sure that implementing such a system results in savings for the organization (Horton, 2000). A cost-benefit analysis will investigate the economic aspect of the system. Once the organization decides to offer online courses, the question is what steps the organization should follow in order to establish a successful network-based training system. Discussed in the following paragraph are the typical steps an organization follows, along with some suggested approaches for carrying out each step. Figure 2 illustrates the flowchart of the system.

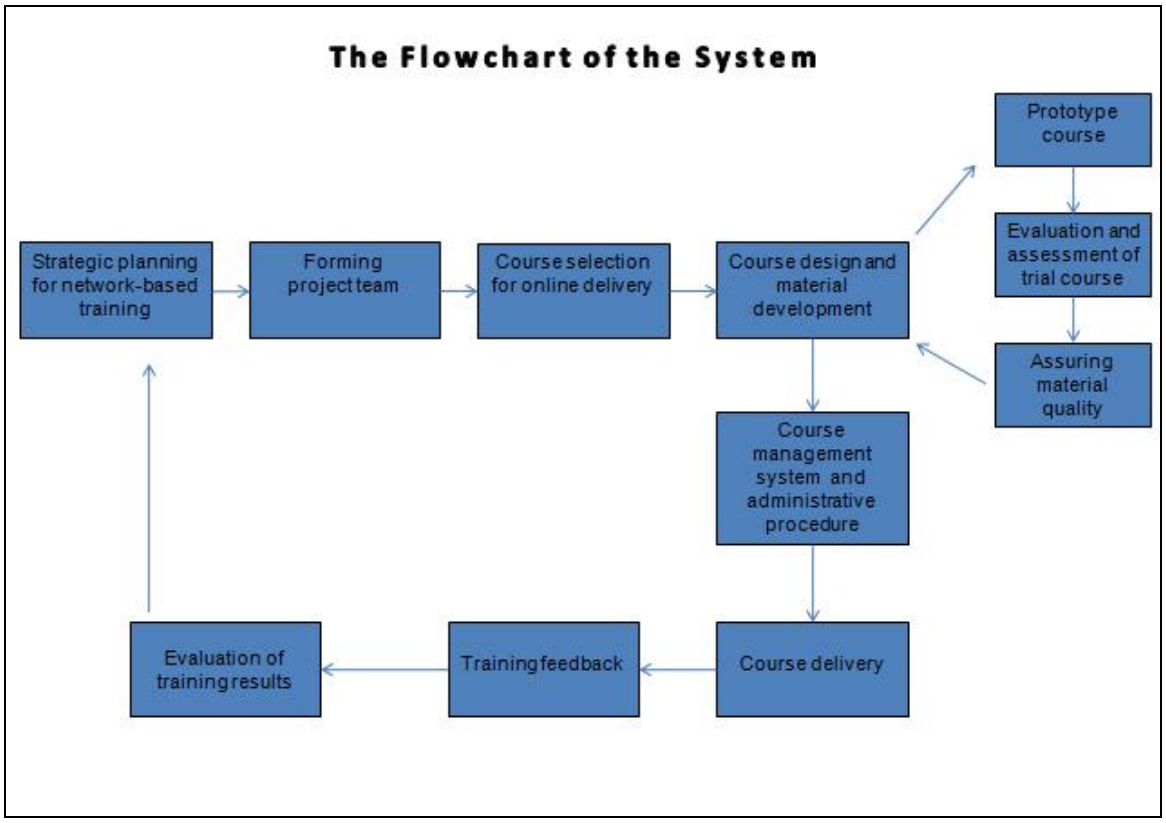

Figure 2. The Flowchart of the System.

The system relies on a successful strategic planning. Once the strategic planning is created, the next step is to form a project team since the project requires a wide range of skills to design, develop, and deploy the system (Driscoll, 2002). This is critical since the team has a significant impact on the success of the project. When choosing the team members, the organization should consider the knowledge, skills and abilities required to successfully manage the project. The team typically consists of a project manager, instructional designers, programmers, graphic artists, subject matter experts, and Webmasters (Vanbuel et al., 2000). After the initial team-building period, the project team should choose the offered courses with the online system. At this stage, one of the assumptions is the organization has already constructed a needs assessment process and determined the critical issues and training needed by its personnel. This is how the training needs of an organization are

determined on the existing traditional system. There needs to be a systematic approach for the selection process. The following are several suggested selection criteria:

- If the program's content and activities are appropriate for the Web
- If the critical content of the course can be easily transmitted by words, pictures, graphs, sounds and videos
- If the content of the training tends to change rapidly (Alden, 1998)

Before fully implementing the proposed system, the organization may consider a pilot course to test the system. This would help evaluate the system before moving into a full implementation of it. According to Kearsley (1990), one of the principal aspects of the planning implementation of any technology is to go slowly and gradually, and expect lots of setbacks and impediments. The incorporation of technology in training results in new ways to accomplish work. The time it takes for people to become compatible with new approaches must be considered as part of the process. The best strategy when proposing any new technology is to start with a small pilot project. A pilot is needed no matter how good an idea or how enthusiastic the project team. The pilot project will uncover potential problems that need to be solved before the full-scale project is implemented (Kearsley, 1990).

The next step is to prepare the materials for a pilot course. The existing instructor needs to help with online course contents and prepare the outlines for the course. Then the instructor should provide all the necessary information to the course developer to develop a prototype online course. Next, the developer should convert the traditional materials into the Web media format. During course development, an organization will need to hire at least one person to generate online materials, since the organization does not have the specialized staff for that job. The course developer should use a presentation software program to create an online course. Course curriculum is typically broken into sections or modules. The course developer follows the basic guidelines that described in the

literature review chapter. For example, a variety of multimedia elements should be used to accomplish course objectives to enhance the learning outcome. The developer understands how to use specific design strategies to increase the learners' motivation, understand the characteristics of adult learners and the principles of adult learning theory. The key is not just transmitting information rather, presenting it in a way to help learners in their learning process. One role of the developer is to learn the details of how instructors taught the course in prior terms. The developer and instructor should be in constant communication with each other throughout the process. After the developer completes tentative course materials, the instructor should go over the materials and offer any comments and/or corrections that are necessary (http://www.psuonline.pdx.edu/docs/id_handbook.htm). At this stage, the organization may delay purchasing a software program and hiring new staff until an organization decides to implement fully the proposed training system. In this case, an organization may consider purchasing service from commercial organizations.

The next step is to deliver the pilot course. After the finalization of the prototype training materials, the next action is to deliver the course to the trainees. The organization's network infrastructure is in place and ready to serve for that project. The organization could use its existing Intranet, user computers, and a new or existing server to deliver online courses. Since all personnel have network access, the assigned trainees can attend the online lesson through the Intranet of the organization. At this stage, there are two basic modes of network-based training to choose from. The first mode is synchronous, in which all three inputs (trainers, trainees and training resources) connect together at the same time. The second mode is asynchronous, in which inputs connect together at different times. Since synchronous connection is hard to accomplish (Alden, 1998), asynchronous mode is the most appropriate approach for the proposed system. Once the implementation of the trial course is complete, the project team is responsible for evaluating and assessing the trial course results. They may

need to make changes to the system. If the outcome of the prototype course is satisfactory after testing, the system is ready to go.

At this stage, the organization possibly will acquire a software program for the course development and delivery purposes. The organization may incorporate a system that integrates a variety of online distance learning functions and capabilities. Such a system may be costly, but it simplifies operations by using common procedures and icons. The following are the factors Kearsley (1990) considered for the selection of a software program:

- Usability – How is it to learn and use the program (how long does it take?)
- Flexibility – How easy is it to change the program parameters?
- Extensibility – Can the program handle new data sets or new hardware options?
- Support – Is technical assistance available when needed?
- Documentation – How comprehensive is it? (p. 66)

If the organization decides to implement the proposed system, the next step is to increase the number of courses conducted with the proposed system. At this stage, the organization may consider hiring an instructional designer as permanent staff member. For each course offered online, be sure to follow every step previously mentioned. Finally, the organization should align the proposed system with the existing traditional system. Allocate an account and a password to all personnel for their access to the system. If appointed to a course, personnel should check their accounts regularly.

Accordingly, the organization is able to distribute seemingly unlimited information to any personnel at any time. In addition to distribution of a course, the flexibility of the network system also allows it to serve a variety of purposes, from course administration to feedback, and each of these functions works toward a different goal (Wisher & Olson, 2003).

Careful consideration should be given to the education and training department being in charge of the following:

- deciding which trainings should be offered by the proposed system
- preparing training content, transforming the content into multimedia form, and presenting it to trainees
- managing curricula and planning the course schedules
- evaluating training results and performance of trainees
- maintaining trainee records

The IT department has control over the infrastructure and technical issues about computers and networks. A network-based training system requires technical support regarding computer problems, network issues, difficulties with passwords, and system crashes (Driscoll, 2002).

Training feedback may play a crucial role in the assessment of the effectiveness of online courses. After finishing a training session, provide each participant trainee with the opportunity to leave feedback and use the information obtained from the feedback to assist in improving the proposed system. It is quite natural that some parts of the course content, sessions, and modules might need to be changed. In any case, evaluate and review courses at certain intervals to check their working conditions.

Implementation issues to consider, while deploying the system, are security, maintenance, and technical support. One additional issue is that since the organization is changing their training implementation methods, change management, strategic planning, and project management are critical in the implementation process of such new technologies. Always keep in mind that every organization has some level of resistance to change.

7. Feasibility Study

An important step in project management is the feasibility study (Kearsley, 1990). The purpose of a feasibility study is to provide information whether or not

the organization is viable to implement the proposed system before the organization invests valuable resources such as time and money. It is a critical part of any project. For a feasibility study of a technology-based project, Lu and Yeung (2000) suggest performing the economic, technical, and organizational feasibility analyses of a system at the project level. They maintain that network-based training system's acceptability hinges on whether the results of all these feasibility analyses are positive or not.

a. Technical Feasibility

In the technical feasibility analysis, the organization should determine whether it has or can acquire the required resources. As discussed earlier in this chapter, the organization needs network infrastructure, user computers, a server, and some software resources.

b. Economic Feasibility

The organization should investigate if the benefits, such as increased revenue, profits, reduced costs and other intangible benefits, outweigh the costs of developing and maintaining the proposed system (Lu & Yeung, 2000). An economic feasibility involves identifying the potential costs regarding any project. Moreover, an economic feasibility study should take into consideration not only infrastructure, hardware and software costs, but also the cost of maintaining the system over time and the added costs of providing back-end support (Lu & Yeung, 2000). Later in this chapter, a detailed cost-benefit analysis will be presented.

c. Organizational Feasibility

It is crucial to know if leadership and personnel are willing to support, operate, and use the proposed system (Lu & Yeung, 2000). Another issue is that the organization should examine if it is ready to change the training system.

An outline for a feasibility study is presented. The organization should produce a detailed feasibility report to find out whether or not the organization is viable to implement the proposed system before the organization starts to implement the proposed project. The outcome of the feasibility study provides a definitive answer to the question whether or not it is possible for the organization to implement the proposed system.

8. Benefits and Limitations

Like all other methods, network-based training has benefits and limitations. This part provides an overview of the benefits and limitations of establishing a network-based training system at an organization.

a. Benefits

Web-based training does not require a training facility and access to online courses is available anywhere. It is also time independent. A trainee can get training anytime as long as he/she has the required connection to the system. However, traditional training requires personnel to be in a certain training facility, mostly away from their place of work, during certain training periods. The capabilities of a Web-based system remove the limitations of traditional classroom training. Training in an online system takes place in the work environment, either on board or on shore, which translates to the reduction or elimination of time spent away from the job by personnel. For example, a traditional classroom course generally requires long travel times associated with going to the training facilities and coming back to the work place. These long travel times add no value to the training. Moreover, travel is one of the main cost factors for traditional training. According to Becker (as cited in Horton, 2000, p. 20), as much as 40% of the cost of corporate training is for travel. Eliminating or reducing such a non-value-added activity means huge cost savings for the organization. An online system may also reduce or eliminate the cost of

paper-based material. Altogether, a Web-based training system may reduce overall training costs. The organization should perform a cost-benefit analysis to investigate potential cost savings.

- Taking personnel away from military units may have unfavorable impact to the operational readiness of it, as the effect may be more detrimental for the Coast Guard, which has smaller ships and less crew in these ships. Reduction or elimination of personnel's time spent away from the job, which is the benefit of an online training, translates to increased operational readiness of military units.
- As Horton (2000) states, learners have more flexibility in learning at their speed and taking the course at their own pace. They set the pace and schedule.
- Network-based training also integrates training with work (Horton, 2000), which means that training may be more meaningful for the trainees.
- Integrated training management systems may store, share, and archive the online course materials continuously, which means that learners may always consult the course materials and refresh their knowledge whenever they desire.
- Since a network-based training system is independent and unaffected by attendance, more employees can be part of the training, which is unlike a traditional training system. Accordingly, a network-based system can ensure that all the personnel in the organization get the right skills and knowledge. This capability may mean in turn increased productivity and effectiveness in the organization (Driscoll, 2002).
- Online training can lighten the workload of a traditional training system.
- An organization can track trainee participation and completion.

b. Limitations

- The organization is required to maintain substantial technical infrastructure. It needs adequate human resources along with hardware and software resources, to support the system. As Driscoll (2002) states, “Web-based training is labor intensive, requiring broad-range skills” (p. 11). According to Horton (2000), Web-based training requires more time and more work than traditional training. One issue is the time spent and work done upfront before the training takes place, as it may be a disincentive for the organization.

- Connection to the network is required to obtain the courses. Learners need be able to log in to the network (Driscoll, 2002).
- Available bandwidth can be a limitation for an online system since it is the main thing that facilitates the amount of multimedia used in course materials (Kruse & Keil, 2000). However, “Current bandwidth limitations will be lessened by expected technological improvements over the next few years” (Sorenson, 1998, p. 17).
- Web-based training requires learners to adapt to new learning methods (Driscoll, 2002). It is important to keep in mind that every organization has some level of resistance to change.
- The lack of human contact can be another limitation (Kruse & Keil, 2000). Furthermore, Web-based training may not be appropriate for teaching psychomotor skills (Driscoll, 1998).

B. COST BENEFIT ANALYSIS

“Cost is always a factor when considering any type of training” (Lee, Mamone, & Roadman, 1995, p. 14). Thus, an organization should perform the cost-benefit analysis of a network-based training system in an analytic manner. The objective is to compare the values of outcomes, costs, and revenues of the proposed system to help in the decision-making process. The intent of this

analysis is to provide a framework to evaluate the impact of establishing the system in the organization. Unless an organization carries out a cost analysis, decision-makers cannot make reliable, well-planned, and carefully considered decisions.

As stated in the literature review, the results of various studies show that network-based instruction can be as effective as traditional instruction. Consequently, the major assumption in the analysis is that both traditional and online training have identical benefits, meaning that they have the same amount of output in terms of learning. As a result, the author does not consider this in his financial analysis. Accordingly, the basis for analysis will only be the costs emerging in the development and delivery processes. The author investigates the proposed system to assess the economic benefits of it and he determines the most important variables that affect the costs and the benefits. The analysis provides a framework to evaluate the estimated values of quantifiable direct cost savings. In the analysis, it is assumed that 1 dollar is equal to 1.5 Turkish liras.

1. Estimated Costs

This section analyzes the potential costs of investing and establishing a network-based training system in the organization. According to Horton (2000), Web-based training is “so diverse that cost estimating is more a matter of wishful thinking than scientific method” (p. 43). The author hypothesizes that there are several (various) key elements that have costs in need of identification in a majority of Web-based training projects. The following are the estimated costs associated with a network-based training system.

a. Hardware Resources

One of the key elements that contribute to server/network hardware costs is the estimated number of the trainees that will access the course. Based on the estimated number of trainees and level of the interactivity designed into the course will determine the server capacity and performance requirements. The higher capacity means the more cost (Sorenson, 1998).

- Server: In the proposed system, the assumption is that the purchase of a server is necessary to offer an online course. The estimated total cost of a server is $5,000. This is a start-up cost as well as a time-independent cost, which means that the cost does not increase over time.
- Computers: Since personnel have their own personal computers that have sufficient specifications for accessing the online training system, the assumption is that that the organization does not have new computer needs, and thus there is no associated cost.

b. Software Resources

Several vendors offer a variety of online distance-learning software products. The organization can acquire software either by obtaining a hosting service from an application service provider (ASP) by paying annual license fee or by purchasing the application by paying a one-time perpetual use license fee (Driscoll, 2006). The author assumes a cost of $1,500 annually for an annual license fee or a one-time cost of $4,000 if the organization gets the perpetual use license. Software costs may be both time-dependent and time-independent costs.

c. Network-Infrastructure

Since the organization has its own Intranet network, the author assumes that there is no network infrastructure cost.

d. Salaries and Wages

The organization needs at least one course developer at the outset. An issue taken into consideration is whether to hire a full-time or outsource the service to a contractor or a third party. For the phase where a prototype course is developed, it may be a right decision to outsource the job. For

developingcourses, the organization may want to hire a full-time employee. Salaries and wages are time-dependent costs. The estimated annual cost of hiring an employee is $16,000.

e. Miscellaneous Costs

The organization should have a budget to maintain and update the system during its lifecycle. Another cost that should also be factored into the analysis is the cost of training users and instructors. Maintenance costs are assumed 10% of initial equipment and courseware costs per year. The estimated cost of training is $3,000, which is a start up cost.

2. Estimated Revenues

In order to achieve the cost-benefit analysis to find out whether the proposed system can reduce training-related costs, the author needs to identify revenues of the proposed system. The author regards the expenses incurred in a traditional system but not anticipated in an online system as the benefits of the proposed system. These costs are the expected revenues of implementing the proposed system.

Regulations require the government to pay expense allowances for government employees while they are on official business travel. Travel expenses include the cost of travel, meals, and employee accommodations. Accordingly, when assigned to training in a place other than their place of work employees obtain reimbursement for their expenses. According to Becker (as cited in Horton, 2000, p. 20), as much as 40% of the cost of corporate training is for travel. In a traditional system, the high cost of transporting personnel from their place of work to training facilities is indispensable. On the other hand, an online system does not have travelling expenses. The author refers to this as the revenue of the proposed system.

Table 1 provides the calculation of average travelling expense per person. Annual revenues are calculated by multiplying these expenses with estimated number of online users.

Area	Distance to Training Facilities	Travel Cost per Km.	Travel Cost
1	544 km.	$0.045	$25
2	958 km.	$0.045	$44
3	446 km.	$0.045	$20
4	724 km.	$0.045	$33
5	489 km.	$0.045	$22
Average Travel Cost (One way) Per Person			$28.8
Average Daily Fee Per Person			$18
Average Course Duration (in Days)			8
Total Expense Allowance Per Person Per Average Course			$201.6

Table 1. The Total Expense Allowance Calculation.

3. Cost Savings Analysis

To identify whether the proposed system is economically worthwhile, the author presents a spreadsheet model (Appendix A). The creation of this model help decision- makers understand the basic concepts of the proposed system. It does not present precise/solid price data, but rather demonstrates hypothetical yet realistic data. By presenting a cost analysis, the author intends for the decision-makers in the organization to have better comprehension of the costs of the proposed system that will assist them in their decision-making process. Table 2 provides the estimated values of input variables. These are the most probable values; however, the model can be updated by changing any of input variables. By using these hypothetical variables, the spreadsheet model computes the total cost savings of the proposed system. Figure 3 provides the estimated cost savings. The model estimates the total cost savings of $30,960 based on the estimated input variables. Obliviously, as the number of online users increases the cost savings of the proposed system increase. It should also be noted that the expected cost is equal to the expected revenue at 74 users. It is the

breakeven point where the expected total cost savings are zero. Less than 74 annual users produce loss instead of savings. It should be kept in mind that these outputs are estimated by applying baseline scenario inputs stated in Table 2.

	Start Up Cost	Ongoing Cost
Network/Infrastructure Cost	$0	$0
Server Cost	$5,000	$0
Software Cost	$4,000	$0
Salaries and Wages	$0	$16,000
Computer Cost	$0	$0
Miscellaneous Costs	$3,000	$1,000
Assumed Life Cycle	6 years	
Assumed Annual Online User	100 users	
Assumed Average Course Duration	8 days	

Table 2. The Estimated Values of Input Variables.

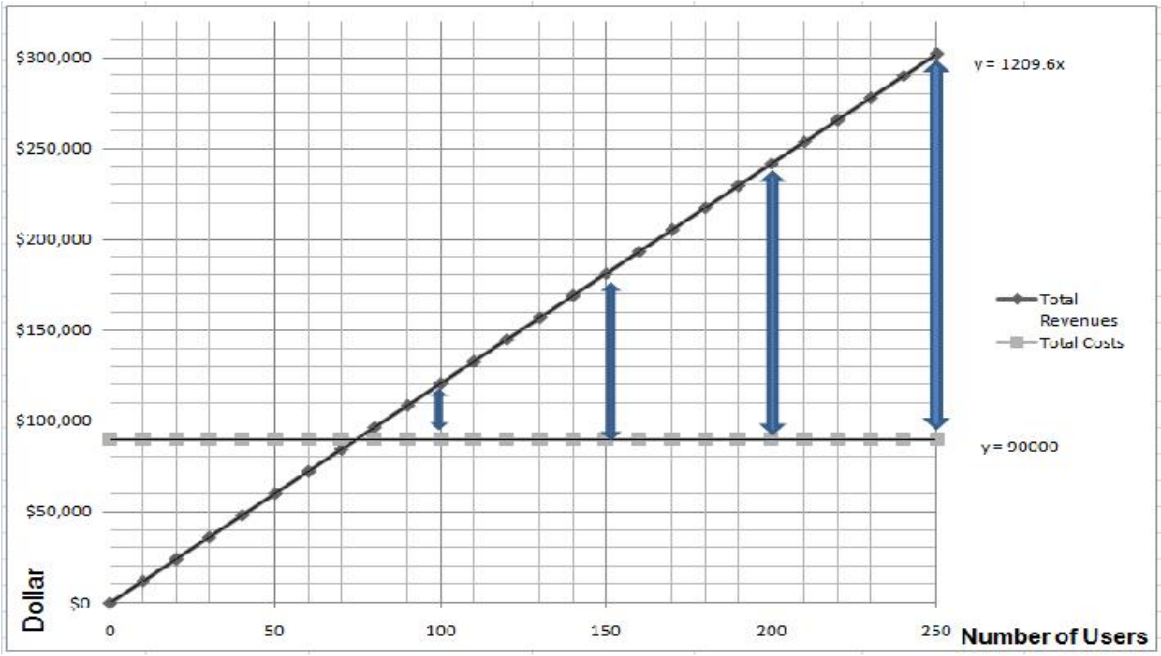

Figure 3. The Estimated Cost Savings.

4. Sensitivity Analysis

In this part, the author presents a sensitivity analysis in order to identify how the total cost savings change as the input variables change. A sensitivity analysis is essential since the input variables are subject to misestimation or change. Figure 4 provides a tornado sensitivity chart that determines how sensitive the cost savings are to the changes of input variables. The analysis employs 10% constant increase and decrease to the baseline values of input variables stated in Table 2. It should also be noted that the tornado chart also ranks the input variables according to their influence to the total cost savings. Average number of online users has the greatest effect. Obviously, as the number of online users increases the cost savings of the proposed system increase. Figure 5 provides the effect of changing the number of annual online users. It should be noted that this chart is generated by changing the number of annual online users and keeping the values of other baseline variables constant.

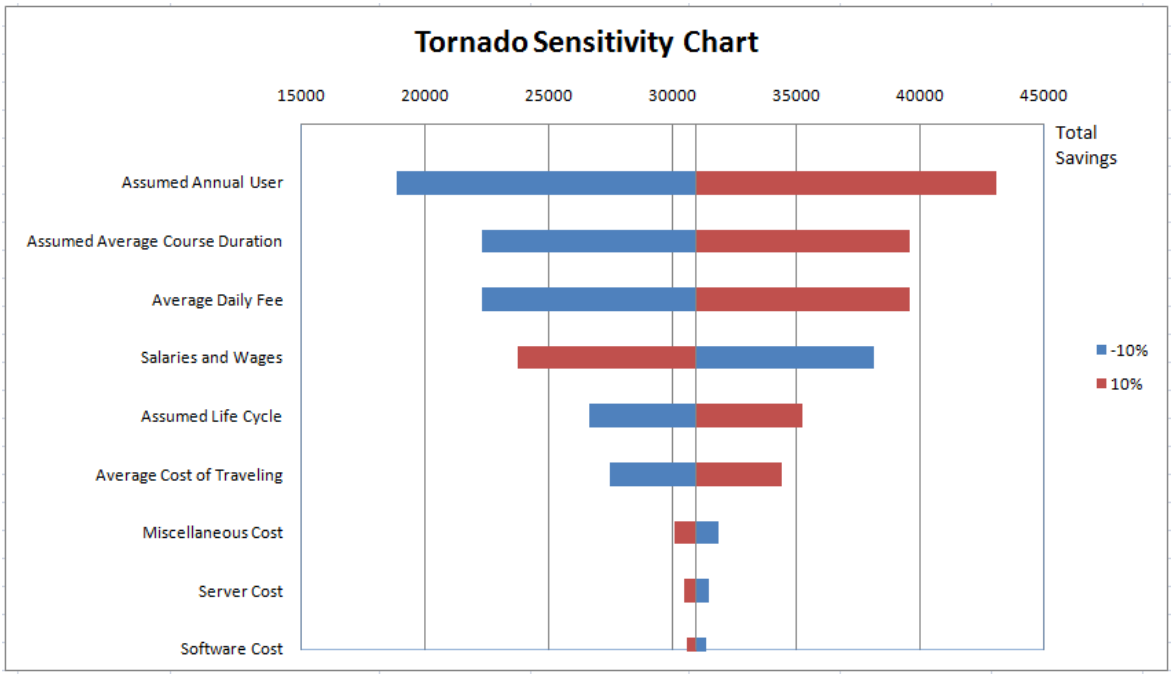

Figure 4. Tornado Sensitivity Chart.

Figure 5. Number of Online Users Sensitivity Chart.

5. Risk Analysis

To predict cost savings correctly, the project also requires performing a risk analysis given the uncertainties among the various input parameters in the model. The spreadsheet model is inadequate to assess risk. Therefore, the author builds a Crystal Ball simulation model to assess risk of the project. Crystal Ball is a spreadsheet-based forecasting and risk analysis program that predicts output variables of interest using probability distributions of associated input variables (Sorenson, 1998). In simulation, input variables are defined by their probability distributions. The probability distributions of input variables create not only point estimation but also probability intervals for the estimation of the cost savings. Figure 6 provides the forecasted probability intervals of the cost savings, which is established after 10,000 simulation replications.

A triangular probability distribution is used to model the average duration of traditional courses that would be replaced with online courses. The training programs offered by the organization range from 3 days to 3 weeks. These are

the minimum and maximum parameters used in the triangular distribution along with most likely value parameter, which is the baseline value of 8 days. The organization does not offer any online course; therefore, it does not have any statistics about online users. However, a triangular distribution is used to model the number of annual online users. The minimum value parameter is assumed 10, the maximum value parameter is assumed 200 and most likey value parameter is assumed 100, which is the baseline input value. Average daily fee for traveling personnel depends on their rank and the budget law states minimum and maximum values of these rates. A uniform distribution is used to model average daily fees per person with a minimum $15 and maximum $21. Life cycle of the system is simulated using a uniform distribution with a minimum value of two and a maximum value of eight. It is assumed that the system has a limited useful lifetime between 2 years to 8 years. A triangular distribution with a minimum value of $9,600, a maximum value of $14,400 and most likely value parameter of $12,000 is used to model the salary and wage of the hired employee. These are the possible starting salaries of a federal employee. Server, software and start up and ongoing miscellaneous cost are simulated using an exponential distribution since either there are not enough original data for the values of these input variables or they require the organization to decide the amount of the cost. Their baseline values of each variable are used as the mean parameter.

By running the model, using input distributions stated above, the Crystal Ball simulation result illustrates the resulting values for the cost savings. Base case is $30,960; mean is $51,828; and median is $37,600. The entire range is from -$104,743 to $483,486. It should also be noted that 77.51% of trials have a positive outcome. Appendix B also provides all input assumptions, statistics and simulation results.

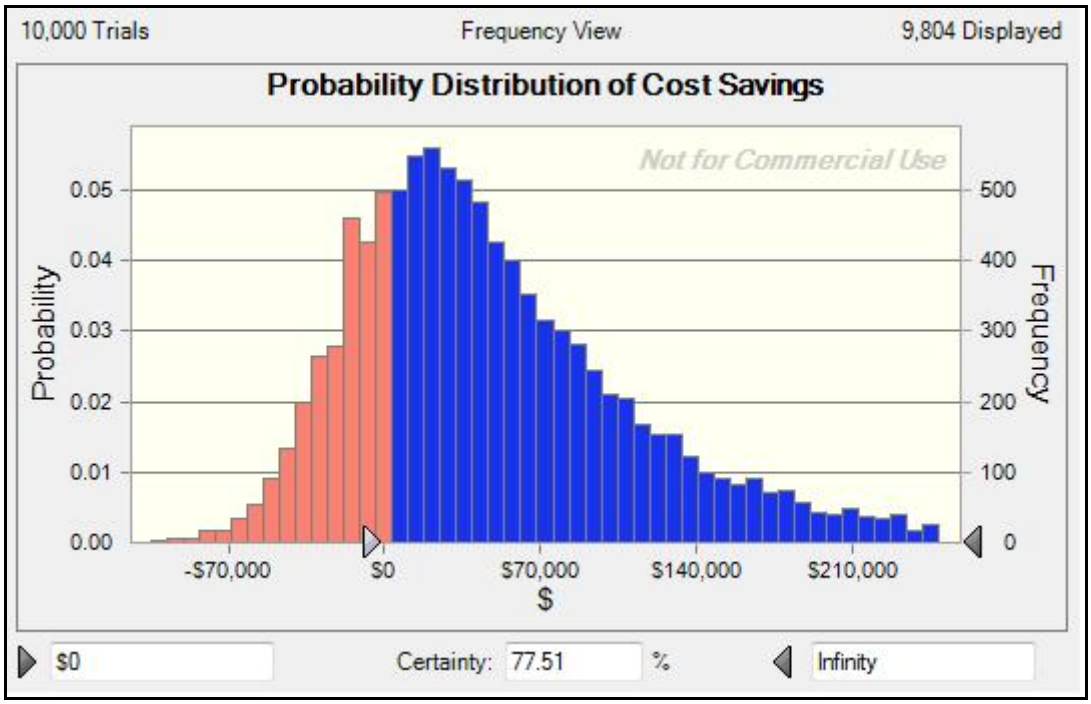

Figure 6. Probability Intervals of Cost Savings.

The outcome of the chapter leads to the conclusions and recommendations that are presented in the next chapter.

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IV. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. SUMMARY

The objective of this thesis was to examine whether the implementation of a network-based training system in the Turkish Coast Guard Command is a viable alternative to traditional classroom-based training. Emerging technologies present new ways of incorporating e-learning into the worksite. A network-based training system is a delivery method that supports an online learning environment. The network such as an organizational Intranet or the Internet consists of software and hardware resources and creates, organizes, manages and delivers training materials. Even though traditional instruction may be the primary method, the network could be a convenient and practical delivery medium for the organizations. The primary benefits of online training are cost savings such as lower travel expenses and less time away from the workplace (Berge, 2001). Traditional training requires personnel to be in a designated training facility, mostly away from their workplace during training. However, the capabilities of a network-based system remove the limitations of traditional classroom-based training. As stated by Kearsley (1984), technology increases the productivity of trainees and trainers through reduced training time, increased job proficiency, and fewer training resources required. This also translates to increases in the organizational productivity.

The analysis in this research involved examining different frameworks for establishing a network-based training system, assessing the effectiveness of the proposed system and determining cost-savings alternatives. The research found a significant amount of literature about the effectiveness, efficiency, speed, and economics of network-based training. However, each organization is different and has its own attributes and abilities. Therefore, these issues must be examined within each organization’s own dynamics.

From the effectiveness aspect, the literature review presented in chapter two showed there is no evidence that network-based training is less effective than traditional classroom training. It is thought by many researchers that online and traditional classroom courses are equally effective. However, a project team must choose the appropriate training method for courses. There are several vital elements critical to the success of the network-based training. This research provided a fundamental look at these issues along with key concepts, models, and theories for the success of the proposed training system.

As previously mentioned, one of the major reasons why organizations use network-based training is the potential for cost savings (Inglis et al., 1999). Cost-effectiveness of online instruction is usually analyzed and assessed with a cost benefit analysis including cost savings, return on investment and breakeven point measurements. The breakeven point is the number of online trainees needed to recover the costs of offering online courses. Return on investment (ROI) is the percentage that represents the net gain or loss from having undertaken a project (Whalen & Wright, 1999). The cost benefit analysis is a preferred method to justify the proposed training system. A spreadsheet model computed the estimated cost savings, breakeven point and return on investment (ROI). Furthermore, the sensitivity analysis identified how the total cost savings change as the input variables change. Finally, the Crystal Ball simulation model assessed the risk of the project given the uncertainties among the various input parameters.

B. CONCLUSIONS

Based on available existing network capabilities it is possible to shift some shore based off site training to Turkish Coast Guard platforms. The organizational Intranet facilitates the required connection between trainees and trainers. Given that network infrastructure is the major cost-driver, the Turkish Coast Guard has a comparative advantage to develop such a training system.

The results showed that the application of the proposed system will not entail significant amounts of capital investment since the Turkish Coast Guard has the required infrastructure.

When selecting a delivery method, the first thing to be considered is the training output. That is how successful the method is in terms of facilitating learning. Based on the research, it is concluded that quality of learning of online training and traditional classroom-based training can be cost effective. However, research also revealed that online training does not teach all learning objectives. It is a fact that online training is not the best delivery method for teaching psychomotor skills. Therefore, a network-based training system should be developed and implemented as a tool to supplement existing traditional classroom-based training practices. This research concluded that establishing a blended system that involves network-based training courses as a supplemental method to the existing traditional classroom courses is a better solution than implementing just one of the training delivery methods. This would give the organization more flexibility and reduce the limitations of each method. One of the drawbacks of traditional training is that taking personnel away from military platforms has unfavorable impact to the operational readiness of military platforms. This effect may be more detrimental for the Coast Guard since it has smaller ships and fewer crewmembers onboard these ships. Reduction or elimination of time spent away from the job and platform, translates into increased operational readiness. However, online training is currently used by large organizations that require significant numbers of online trainees in order to recover the costs of establishing such a system. The elevated costs of initial venture may be one of the barriers, which can impede the implementation of the system.

Before integrating the mixed system, the organization should examine the effects of implementing network-based training. Planning is a critical component. A successful implementation of the system after planning process can lead the Coast Guard into a new way that will improve the organizational productivity.

Clearly, any improvement that can be made in the learning of trainees from online courses will result in substantial benefits to the Coast Guard.

The cost benefit analysis presented in chapter three concluded that network-based training is a cost-effective alternative to traditional classroom-based training. Substantial savings are possible from reduced or eliminated travel costs. Total value of cost savings using baseline input variables is estimated to be approximately $31,000 due to establishing a network-based training system in the Turkish Coast Guard. Since the outcome was a dependent variable, please note that changing the independent input variables resulted in a change in the value of the outcome. It should also be noted that the analysis presented does not account for the intangible or unquantifiable benefits such as increased operational readiness and labor and time savings for the traditional instruction. The sensitivity analysis revealed how the total cost savings change as the input variables change. There are a number of factors that affect the cost savings. A major determining factor in cost savings was the number of average annual users. Obviously, as the number of online users increases the cost savings of the proposed system increase. The second factor was the average duration of traditional courses that replaced online courses. The third factor was the number of staff hired and salaries paid.

The organizational analysis concluded that the breakeven point, the number of annual online users, was estimated to be seventy-four. This figure indicates that the organization would need more than 74 online users annually to justify the use of a network-based training system. The expected return on investment (ROI) over the project life cycle is approximately 35%. It should be noted that both the breakeven point and return on investment (ROI) are calculated under the baseline scenario. The following are the values of important input variables of the baseline scenario which are the major cost drivers. It is assumed that the organization would hire an instructional designer as permanent staff member, the average duration of traditional courses that would be replaced with online courses would be eight days, the life cycle of the proposed system

would be six years, and the average daily fee paid to federal employees was $18.00. Furthermore, changing input variables will change the values of the multiple outputs; cost savings, the breakeven point and return on investment.

This research identified the potential and limitations of establishing a network-based training system and suggested that it is a feasible and cost-effective alternative to traditional classroom-based training. Additionally, an increase the effectiveness and efficiency of training with online courses translates to an increase in the organizational productivity. More than being just a cost-effective solution, there is no doubt that online training would be indispensible in the near future and play an important role in any organization. It seems certain that online training will become increasingly commonplace in the future. The Turkish Coast Guard is compelled to keep exploring new learning technologies and position itself to take full advantage of these best practices and its potential to support and accomplish its missions and sustain its development in the twenty-first century.

C. RECOMMENDATIONS

The research supports the following recommendations to implement a network-based training system in the Turkish Coast Guard:

1. Develop and maintain a strategic training plan that implements onboard training in Turkish Coast Guard vessels. Build a project team with the various skills. This team should consist of a project manager, online course developer, IT experts and subject matter experts. Training and IT departments should be in charge of building the project team. Ensure effective coordination between departments and team members. The management and the project team ought to initiate a strategic planning process.

2. Examine cultural organizational readiness. The Coast Guard should examine if it is ready to change the training system. Investigate and work with other organizations, which successfully incorporate online

learning. Consider a pilot course to test the system before fully implementing the proposed system. This would help evaluate the system before moving into a full implementation. Hire a course developer/instructional designer with extensive knowledge and experience in order to develop online materials since developing online courses requires specialized expertise in this subject.

3. Offer online courses organization-wide, select courses appropriate for online delivery, develop course design and online materials, use a course management system for the course development, delivery and management purposes. Development of online materials and creation of their content requires a systems approach in which the goal is to assure the quality of the training materials. Monitor and evaluate the effectiveness of online courses and performance of trainees on a regular basis.
4. Develop a financial management plan and ensure sufficient budget to initiate the project.
5. Be cognizant of the cultural change caused by integrating new practices. Always keep in mind that people have some level of resistance to change. It may be one of the impediments to a successful implementation. The support of senior management is critical to manage change. Encourage personnel to support and use the system.

The study recommends the following subjects have curriculum developed and put on-line. These are example courses that could be offered:

- New employee orientation training
- Retirement-related courses
- Communications courses
- Information technologies and computer training
- Stress management training
- Presentation skills training

- Information assurance training
- Safety training
- Basic first aid training
- Foreign language courses
- International regulations for preventing collisions at sea courses

The research articulated the benefits and limitations of the proposed system, conducted a cost benefit analysis and examined the potential impact on the productivity, efficiency and effectiveness. Further studies are required to determine the effects of online trainings on the trainees, trainers and the overall organization. A suggestion for future research is the development of metrics to evaluate the potential impact of the proposed system on productivity in the organization.

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APPENDIX A: COST SAVINGS MODEL

Costs

Network / Infrastructure Cost	(Start up cost)	$0
Server Cost	(Start up cost)	$5,000
	Number of servers: 1	
Software Cost	(Start up cost)	$4,000
Salaries and Wages	(On-going cost)	$12,000
	Number of employee hired: 1	
Computer Cost	(Start up cost)	$0
Miscellaneous Cost	(Start up/On-going cost)	$4,000
	Training (Start up): $3,000	Maintenance (On-going): $1,000
Assumed Life Cycle	6 years	
Assumed Annual User	100 personnel	
Assumed Average Course Duration	8 days	
Total Start up Cost:	**$12,000**	
Total Annual Ongoing Cost:	**$13,000**	

Year	Start up Cost	Ongoing Cost	Annual Cost	Cumulative Cost
1	$12,000	$13,000	$25,000	$25,000
2	$0	$13,000	$13,000	$38,000
3	$0	$13,000	$13,000	$51,000
4	$0	$13,000	$13,000	$64,000
5	$0	$13,000	$13,000	$77,000
6	$0	$13,000	$13,000	$90,000

Revenues

	Distance to training facility	Travel cost per km.	Total travel cost
Area 1	544 km.	0.045	$25
Area 2	958 km.	0.045	$44
Area 3	446 km.	0.045	$20
Area 4	724 km.	0.045	$33
Area 5	489 km.	0.045	$22

Average cost of traveling	$28.8
Average daily fee	$18.0
Average course duration (in days)	8
Expense allowance per person for each traditional course (Revenue per online user)	$202

Cost Savings

Annual Number of Online Trainees	Annual Expense Allowance	Total Revenues (Expense Allowance During Life-Cycle)	Total Cost	Cost Savings
0	$0	$0	$90,000	-$90,000
10	$2,016	$12,096	$90,000	-$77,904
20	$4,032	$24,192	$90,000	-$65,808
30	$6,048	$36,288	$90,000	-$53,712
40	$8,064	$48,384	$90,000	-$41,616
50	$10,080	$60,480	$90,000	-$29,520
60	$12,096	$72,576	$90,000	-$17,424
70	$14,112	$84,672	$90,000	-$5,328
80	$16,128	$96,768	$90,000	$6,768
90	$18,144	$108,864	$90,000	$18,864
100	**$20,160**	**$120,960**	**$90,000**	**$30,960**
110	$22,176	$133,056	$90,000	$43,056
120	$24,192	$145,152	$90,000	$55,152
130	$26,208	$157,248	$90,000	$67,248
140	$28,224	$169,344	$90,000	$79,344
150	$30,240	$181,440	$90,000	$91,440
160	$32,256	$193,536	$90,000	$103,536

170	$34,272	$205,632	$90,000	$115,632
180	$36,288	$217,728	$90,000	$127,728
190	$38,304	$229,824	$90,000	$139,824
200	$40,320	$241,920	$90,000	$151,920
210	$42,336	$254,016	$90,000	$164,016
220	$44,352	$266,112	$90,000	$176,112
230	$46,368	$278,208	$90,000	$188,208
240	$48,384	$290,304	$90,000	$200,304
250	$50,400	$302,400	$90,000	$212,400
260	$52,416	$314,496	$90,000	$224,496
270	$54,432	$326,592	$90,000	$236,592
280	$56,448	$338,688	$90,000	$248,688
290	$58,464	$350,784	$90,000	$260,784
300	$60,480	$362,880	$90,000	$272,880
310	$62,496	$374,976	$90,000	$284,976
320	$64,512	$387,072	$90,000	$297,072
330	$66,528	$399,168	$90,000	$309,168
340	$68,544	$411,264	$90,000	$321,264
350	$70,560	$423,360	$90,000	$333,360
360	$72,576	$435,456	$90,000	$345,456
370	$74,592	$447,552	$90,000	$357,552
380	$76,608	$459,648	$90,000	$369,648
390	$78,624	$471,744	$90,000	$381,744

Cost Savings for Baseline Scenario : $30,960

Return on Investment : 34.4%

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APPENDIX B: CRYSTAL BALL REPORT

Simulation started on 10/27/2009 at 22:57:07
Simulation stopped on 10/27/2009 at 22:57:10

Run preferences:

Number of trials run	10,000
Extreme speed	
Monte Carlo	
Random seed	
Precision control on	
Confidence level	95.00%

Run statistics:

Total running time (sec)	1.03
Trials/second (average)	9,692
Random numbers per sec	87,230

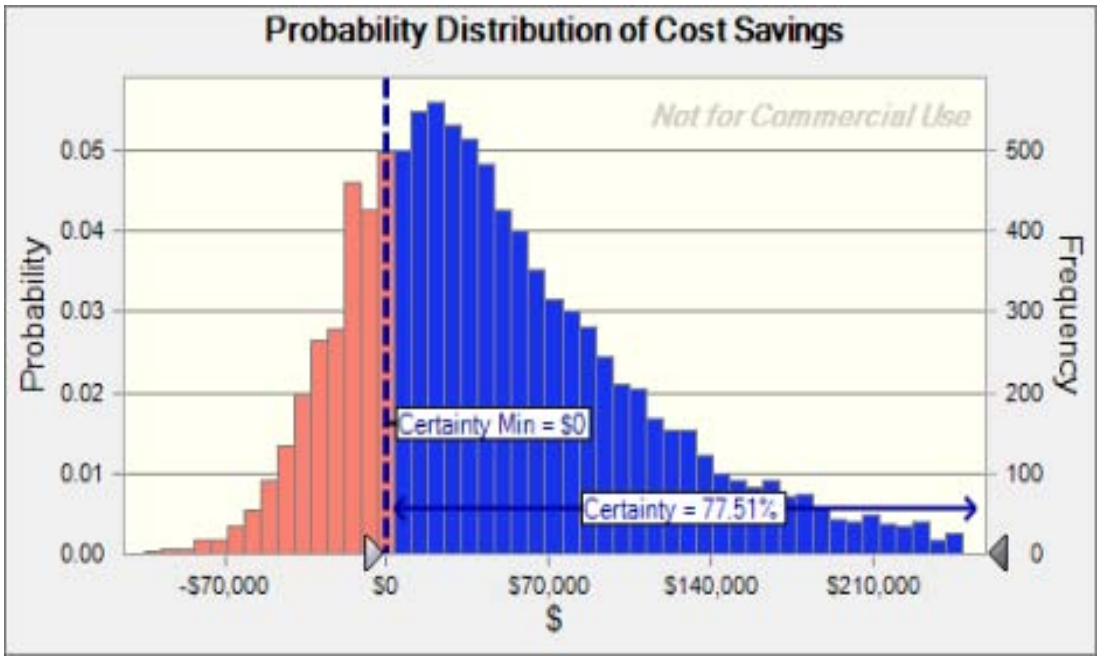
Crystal Ball data:

Assumptions	9
Correlations	0
Correlated groups	0
Decision variables	0
Forecasts	1

Forecasts

Forecast: Total Cost Savings

Summary:
Certainty level is 77.51%
Certainty range is from $0 to Infinity
Entire range is from -$104,743 to $483,486
Base case is $30,960
After 10,000 trials, the std. error of the mean is $703



Statistics:	Forecast values
Trials	10,000
Mean	$51,828
Median	$37,600
Mode	---
Standard Deviation	$70,292
Variance	$4,940,955,097
Skewness	1.30
Kurtosis	5.57
Coeff. of Variability	1.36
Minimum	-$104,743
Maximum	$483,486
Range Width	$588,228
Mean Std. Error	$703

Forecast: Total Cost Savings (cont'd)

Percentiles:	Forecast values
0%	-$104,743
10%	-$20,483
20%	-$3,664
30%	$10,720
40%	$24,038

50%	$37,587
60%	$53,188
70%	$72,908
80%	$99,190
90%	$144,020
100%	$483,486

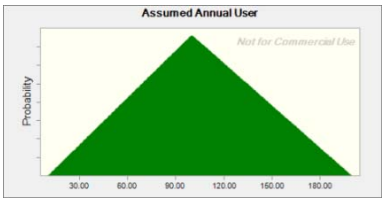
End of Forecasts

Assumptions

Assumption: Assumed Annual User

Triangular distribution with parameters:

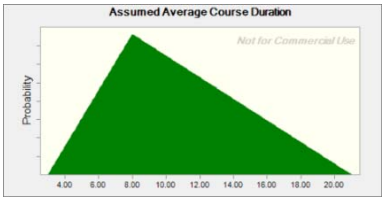
Minimum	10.00
Likeliest	100.00
Maximum	200.00



Assumption: Assumed Average Course Duration

Triangular distribution with parameters:

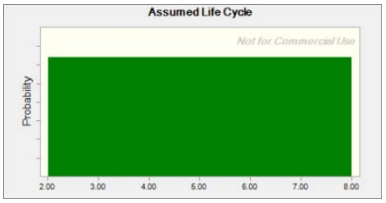
Minimum	3.00
Likeliest	8.00
Maximum	21.00



Assumption: Assumed Life Cycle

Uniform distribution with parameters:

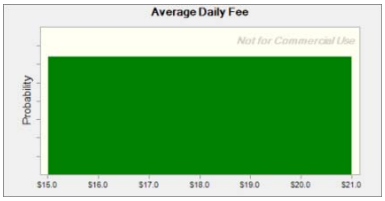
Minimum	2.00
Maximum	8.00



Assumption: Average Daily Fee

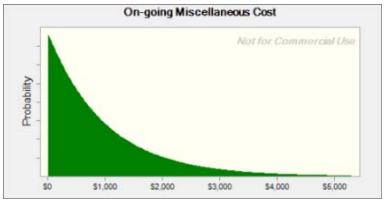
Uniform distribution with parameters:

Minimum	$15.0
Maximum	$21.0



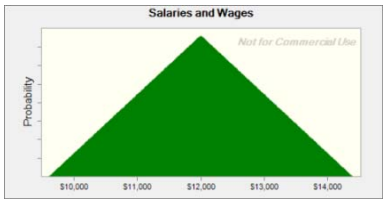
Assumption: On-going Miscellaneous Cost

Exponential distribution with parameters:
Rate $0



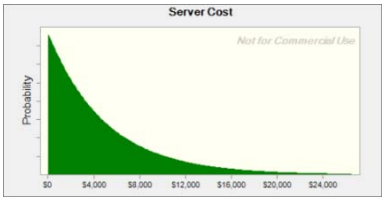
Assumption: Salaries and Wages

Triangular distribution with parameters:
Minimum $9,600
Likeliest $12,000
Maximum $14,400



Assumption: Server Cost

Exponential distribution with parameters:
Rate $0



Assumption: Software Cost

Exponential distribution with parameters:
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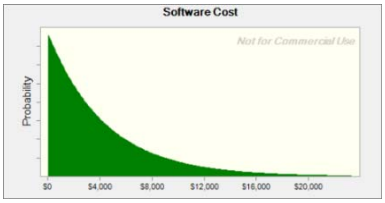

Assumption: Start-up Miscellaneous Cost

Exponential distribution with parameters:
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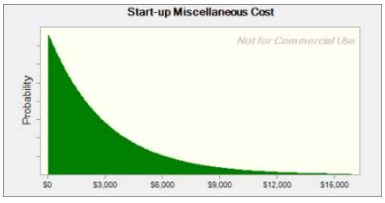
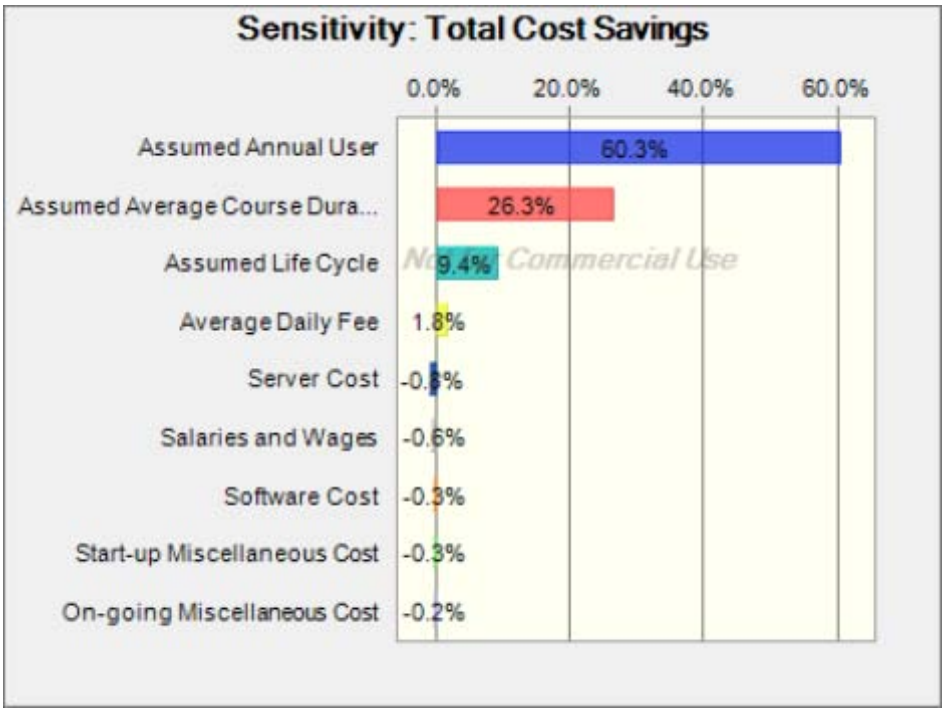


End of Assumptions

Sensitivity Charts



End of Sensitivity Charts

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LIST OF REFERENCES

Adrian, C. M. (2002). Developing a learning environment: Applying technology and TQM to distance learning. In M. Khosrow-Pour (Ed.) Web-based instructional learning. (pp. 43–58). Pennsylvania: IRM.

Aggarwal, A. K., & Bento, R. (2002). Web-based education. In M. Khosrow-Pour (Ed.) Web-based instructional learning. (pp. 59–77). Pennsylvania: IRM.

Alden, J. (1998). A trainer's guide to Web-based instruction: Getting started on Intranet- and Internet-based training. Virginia: American Society for Training & Development.

Ausubel, D. (1963). The psychology of meaningful verbal learning. New York: Grune and Stratton.

Baxter, B. (1993). Workforce training center. In J. V. Boettcher (Ed.) 101 success stories of information technology in higher education: the Joe Wyatt challenge. (pp. 97–109). McGraw-Hill.

Berge, Z. L. (2001). Sustaining distance training: Integrating learning technologies into the fabric of the enterprise. San Francisco: Jossey-Bass.

Berge, Z. L., & Smith, D. L. (2002). Implementing corporate distance training using change management, strategic planning and project management. In M. Khosrow-Pour (Ed.) Web-based instructional learning. (pp. 15–27). Pennsylvania: IRM.

Berry, L. H. (2002). Cognitive effects of Web page design. In M. Khosrow-Pour (Ed.) Web-based instructional learning. (pp. 90–109). Pennsylvania: IRM.

Boettcher, J. V. (2000). How much does it cost to put a course online? It all depends. In M. J. Finkelstein, C. Frances, F. I. Jewett, & B. W. Scholz (Eds.) Dollars, distance, and online education: The new economies of college teaching and learning. (pp. 172–198). Arizona: Oryx.

Bogardus, A. (2007). PHR/SPHR: Professional in human resources certification study guide. Indiana: Wiley.

Bosco, J., & Morrison, J. E. (2000). Contexts for training. In S. Tobias & J. D. Fletcher (Eds.) Training & retraining: A handbook for business, industry, government, and the military. (pp. 25–50). New York: Macmillan Reference.

Bower, G. H., & Hilgard, E. R. (1981). Theories of learning (5th ed.). New Jersey: Prentice-Hall.

Brooks, D. W., Nolan, D. E., & Gallagher, S. M. (2001). Web-teaching: A guide to designing interactive teaching for the World Wide Web (2nd ed.). New York: Kluwer Academic/Plenum.

Brown, J. W., Lewis, R. B., & Harcleroad, F. F. (1959). A-V instruction materials and methods. New York: McGraw-Hill.

Colteryahn, K. & Davis, P. (2004). The 8 trends. Training + Development. January, 2004, 30–36.

Coombs, P. H., & Hallak, J. (1987). Cost analysis in education: A tool for policy and planning. Baltimore: The Johns Hopkins University.

Cooper, L. (2002). Online courses: Strategies for success. In R. Discenza, C. Howard, & K. Schenk (Eds.) The design and management of effective distance learning programs. (pp. 125–140). Pennsylvania: Idea Group.

Currie, D. (1997). Personnel in practice: For the new IPD-CPP. London: Blackwell.

Department of Defense. (2000). Implementation plan for advanced distributed learning.

Driscoll, M. (1998). Web-based training: Using technology to design adult learning experiences. San Francisco: Jossey-Bass/Pfeiffer.

Driscoll, M. (2002). Web-based training: Creating e-learning experiences (2nd ed.). San Francisco: Jossey-Bass/Pfeiffer.

Funk, S. L., & McBride, D. (2000). Training in the twenty-first century. In S. Tobias & J. D. Fletcher (Eds.) Training & retraining: A handbook for business, industry, government, and the military. (pp. 550–570). New York: Macmillan Reference.

Goldstein, I. L., & Ford J. K. (2002). Training in organizations (4th ed.). California: Wadsworth.

Hartley, J. (1985). Designing instructional text. (2th ed.). London: Kogan Page.

Havelock, R. G., & Havelock, M. C. (1973). Training for change agents: A guide to design of training programs in education and other fields. Michigan: Institute for Social Research, the University of Michigan.

Heerkens, G. (2002). Project management. New York: McGraw-Hill.

Hickey, A. E. (1968). Computer-assisted instruction: A survey of the literature. Massachusetts: Entelek.

Horton, W. (2000). Designing Web-based training. New York: Wiley.

Inglis, A., Ling, P., & Joosten, V. (1999). Delivering digitally: Managing the transition to the knowledge media. London: Kogan Page.

Jerling, K. (1996). Education, training, and development in organization. Pretoria: Kagiso.

Kearsley, G. (1990). Computers for educational administrators: Leadership in the information age New Jersey: Ablex.

Khorosrow-Pour, M. (2002). Web-based instructional learning. Pennsylvania: IRM.

Kinder, J. S. (1965). Using audio-visual materials in education. New York: American Book.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (1998). The adult learner: The definitive classic in adult education and human resource development. Texas: Golf.

Kouki, R., & Wright, D. (1999). Telelearning via the Internet. Pennsylvania: Idea Group.

Kovalchick, A., & Dawson, K. (2004). Education and technology: An encyclopedia. California: ABC-CLIO.

Kruse, K. & Keil, J. (2000). Technology-based training: The art and science of design, development, and delivery. California: Jossey-Bass/Pfeiffer.

Laird, D. (1985). Approaches to training and development. Learning theories. Oxford Brookes University Web page. Retrieved July 14, 2009, from http://www.brookes.ac.uk/services/ocsd/2_learntch/theories.html

Lawson, K. (2006). The trainer's handbook. San Francisco: Pfeiffer.

Lee, W. W., Mamone, R. A., & Roadman, K. H. (1995). Computer based training handbook: Assessment, design, development, evaluation. New Jersey: Educational Technology.

Lu, M., & Yeung, W. l. (2000). Planning for effective Web-based commerce application development. In M. Khosrow-Pour (Ed.) Managing Web-enabled technologies in organizations: A global perspective. (pp. 36-53). Pennsylvania: Idea Group.

Marcovitz, D. M. (2004). Powerful powerpoint for educators: Using visual basic for applications to make powerpoint interactive. Connecticut: Libraries Unlimited.

Maurer, H. A. (1999). A critical look at Web based training efforts. Proc. HCI 99, L. Erlbaum Associates, London, Vol.2, 718–724.

Mayo, A. (2001). The human value of the enterprise: Valuing people as assets-monitoring, measuring, managing. Illinois: Nicholas Brealey.

McClelland, S. B. (1995). Organizational needs assessments: Design, facilitation, and analysis. Connecticut: Quorum.

McShane, S. L., & Von Glinow, M. A. (2009). Organizational behavior [essentials] (2nd ed.). New York: McGraw-Hill/Irwin.

Megil, K. A. (1997).The corporate Memory: Information Management in the electronic age. West Sussex, UK: Bowker-Saur.

Mikulas, W. L. (1974). Concepts in learning. Philadelphia: W.B. Saunders.

Miller, V. A. (1996). The history of training. In R.L. Craig (Ed.), The ASTD training and development handbook: A guide to human resource development. (pp. 3-18). New York: McGraw-Hill.

Myers, J. (2004). The color of learning. Training + Development. February, 2004, 19–20.

O'Connor, B. N., Bronner, M., & Delaney, C. (2002).Training for organizations (2nd ed.). Ohio: South-western.

O'Rourke, J., Sedlack, R., Shwom, B., & Keller, K. (2008). Graphics and visual communication for managers. Ohio: Thomson South-Western.

Palin, P. J., & Sandhaas, K. (2000). Architect for learning. Virginia: Saint Thomas Didymus.

Pasternack, B. A., & Viscio, A. J. (1998). The centerless corporation: A new model for transforming your organization for growth and prosperity. New York: Simon & Schuster.

Porter, D., Bennet, A., Turner, R., & Wennergren, D. (n.d.). The power of team: The making of a CIO.

Reigeluth, C.M. (1983). Instructional design theories and models. New Jersey: Lawrence Erlbaum.

Reinking, D., & Bridwell-Bowles, L. (1996). Computers in reading and writing. In R. Barr, P. D. Pearson, M. L. Kamil, & P. Mosenthal (Eds.) Handbook of reading research: Volume II. (pp. 310–340). New Jersey: L. Erlbaum.

Rivers, D., Joseph, B., Gunter, S. K., Kettell, J. A., & Kettell, G. (2009). Microsoft Office 2008 for Mac: Bible. New Jersey: Wiley.

Rouda, R. H., & Kusy, M. E. (1995). Needs assessment: The first step. Retrieved July 17, 2009, from http://alumnus.caltech.edu/~rouda/T2_NA.html

Rousseau, D.M. (1997). Organizational behavior in the new organizational era. Annual Review of Psychology.

Rowley, D. J., Lujan, D. L., & Dolence, M. G. (1998). Strategic Choices for the academy: How demand for lifelong learning will re-create higher education. San Francisco: Jossey-Bass.

Salmon, G. (2004). E-moderating: The key to teaching and learning online. (2nd ed.). London: Taylor & Francis.

Salopek, J. J. (2004). Targeting the learning. Training + Development. March, 46–51.

Savage, C. M. (1996). 5th Generation management: Co-creating through virtual enterprising, dynamic teaming, and knowledge networking. Massachusetts: Butterworth-Heinemann.

Smith, S. S. (2006). Web-based instruction: A guide for libraries. Chicago: American Library Association.

Solove, D. J. (2004). The digital person: Technology and privacy in the information age. New York: New York University.

Sorenson, B. K. (1998). Costs and benefits of network based instruction at the Naval Postgraduate School. Unpublished master's thesis, Naval Postgraduate School.

Steed, C. (1999). Web-based training. Vermont: Gower.

Steinberg, E. R. (1984). Teaching computers to teach. New Jersey: Lawrence Erlbaum.

Stone, D. E., & Koskinen, C. L. (2002). Planning and design for high-tech Web-based training. Boston: Artech House.

Sungrue, B. & Clark, R. E. (2000). Media selection for training. In S. Tobias & J. D. Fletcher (Eds.) Training & retraining: A handbook for business, industry, government, and the military. (pp. 208–234). New York: Macmillan Reference.

Tennyson, R. D., & Foshay, W. R. (2000). Instructional Systems Development. In S. Tobias & J. D. Fletcher (Eds.) Training & retraining: A handbook for business, industry, government, and the military. (pp. 111–147). New York: Macmillan Reference.

Tobias, S., & Frase, L.T. (2000). Educational psychology and training. In S. Tobias & J. D. Fletcher (Eds.) Training & retraining: A handbook for business, industry, government, and the military. (pp. 3-24). New York: Macmillan Reference.

Udoh-Ilomechine, Q. (2009). Patterns of in-service training for special libraries: A pilot study. February (1522-0222). Retrieved July 14, 2009, from http://unllib.unl.edu/LPP/udoh2.htm

Vanbuel, M., Boonen, A., & Scheffknecht, J. J. (2000). Towards a learning organization: Reviewing technologies for company training. Leuven: Leuven University.

Verzuh, E. (2005). The fast forward MBA in project management. New Jersey: John Wiley & Sons.

Wang, H., Xu, H., Chan, H. C., & Chen, L. (2002). Critical success factors for Web-based organizational IT training systems. In J. Fong (Ed.) Advances in Web-based learning: First international conference, ICWL 2002, Hong Kong, China, August 2002 proceedings. (pp. 142-151). New York: Springer.

Whalen, T. & Wright, D. (1999). Methodology for cost-benefit analysis of Web-based tele-learning: Case study of the Bell Online Institute. The American journal of distance education, Vol. 13, No. 1, 25–43.

Wisher, R. A. & Olson, T. M. (2003). The effectiveness of Web-based instruction. U.S. Army Research Institute for the Behavioral and Social Sciences.

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